DOCUMENT RESUME

ED 443 235 EC 307 929

AUTHOR	Miller, Phyllis, Ed.
TITLE	G, Etc.
INSTITUTION	American Mensa Education and Research Foundation, Arlington, TX.
PUB DATE	1999-00-00
NOTE	93p.; Theme issue. Published three times a year.
AVAILABLE FROM	Mensa Research Journal, 1229 Corporate Drive West, Arlington, TX 76006-6103.
PUB TYPE	Collected Works - Serials (022)
JOURNAL CIT	Mensa Research Journal; n41 Win 1998-1999
EDRS PRICE	MF01/PC04 Plus Postage.
DESCRIPTORS	*Ability Grouping; Cluster Grouping; Creativity; *Educational Research; *Educational Strategies; Elementary Secondary Education; *Gifted; Problem Solving; *Psychological Characteristics; *Talent Development

ABSTRACT

This issue of a research journal on gifted education explores the concept of intelligence and giftedness, talent development, gifted education, and educational research. Specific articles include: (1) "Spearman Revisited: Contemporary Views of g" (Milton Dehn); (2) "Exceptionally High Intelligence and Schooling" (Ellen Winner), which argues for raising standards for all children and providing advanced classes in the specific domain of advanced ability for gifted children; (3) "Review of Ellen Winner, 'Gifted Children: Myths and Realities'" (Nancy Robinson); (4) "Psychological Aspects of Giftedness" (Camilia Persson Benbow); (5) "Programs for the Gifted Few or Talent Development for the Many?" (John Feldhusen), which discusses the need for students at all ages and grade levels to be provided with challenging and appropriate instruction; (6) "Barriers to Research in Gifted Education" (Dewey G. Cornell), which examines psychological and methodological barriers to more effective research on high ability children and provides positive and negative examples to illustrate some of the pitfalls researchers face in the field; and (7) "Bibliography of Recent Books on Creativity and Problem Solving" (Susan M. Stievater), which contains a list of 90 references. (Articles include references.) (CR)

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Mensa Research Journal #41
Winter 1998 – 1999

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Mensa Research Journal is published three times a year by the American Mensa Education and Research Foundation, Dr. Michael Jacobson, President, 1840 N. Oak Park Ave., Chicago, IL 60635-3314.

Staff:

Editor • Phyllis Miller, 23 Lexington Road, Somerset, NJ 08873, millerph@saturn.montclair.edu

Associate Editor • Francis Cartier, 1029 Forest Ave., Pacific Grove, CA 93950

Assistant Editor • Al Derr, 831 Lombardy Drive, Lansdale, PA 19446, derr@vu-visi.ee.vill.edu

Circulation Manager • Betsy Mark, American Mensa Ltd., 1229 Corporate Drive West, Arlington, TX 76006-6103

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Mensa, the high IQ society, provides a meeting of the minds for people who score in the top two percent on standardized IQ tests. As an international organization with thousands of members worldwide, Mensa seeks to identify and foster human intelligence; encourage research in the nature, characteristics and uses of intelligence; and provide a stimulating intellectual and social environment for its members.

The first two of these purposes are largely carried out by the American Mensa Education and Research Foundation (MERF). MERF is a philanthropic nonprofit, tax-exempt organization funded primarily by gifts from Mensa members and others. MERF awards scholarships and research prizes, publishes the Mensa Research Journal, and funds other projects consistent with its mission.

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Associate Editor's Preface

Phyllis Miller, Editor of Mensa Research Journal, has appointed me Associate Editor and put me in charge of one issue a year. We plan to do a few things differently in the issues I edit. Ordinarily, about half an issue of MRJ has been devoted to reprinting research reports that were submitted in the Mensa Education and Research Foundation's competition for Awards for Excellence in Research and about half to articles Editor Miller has found elsewhere or solicited from recognized experts. That will continue. However, in one issue each year, we may deviate from that policy somewhat and might reprint book reviews, bibliographies, abstracts of research reports, and other kinds of items. If you have any ideas about the kinds of things you'd like to see in this issue, perhaps even specific articles that you believe would be of interest to our readers, please let me know. Address your letters to Francis Cartier, Associate Editor, Mensa Research Journal, 1029 Forest Ave., Pacific Grove, CA 93950-4814, USA.

Both Editor Miller and I would particularly appreciate comments from our readers outside the United States.

Francis Cartier
Associate Editor

Notes, Quotes And Anecdotes

One difference between the issues that Phyllis Miller edits and mine is that I may briefly and somewhat randomly direct your attention to other research and theory articles on intelligence and giftedness. Furthermore, I'm likely to give you unabashedly my own, sometimes controversial opinions (which are not the opinions of American Mensa, Ltd. or of the Mensa Education and Research Foundation). Please feel free to write when you disagree with me. I might even publish your responses in whole or in part in later issues. I won't always burden this column with full bibliographical citations for the journals and books I mention. Ask any bookstore or reference librarian. Reference librarians are usually delighted to get a question they haven't been asked several times a week such as, "Name the seven dwarfs," and, after all, we taxpayers are paying their salaries. If all else fails write to me.

So much is being published these days about such issues as "What is intelligence?" and "What is thinking?" that I doubt anyone who's not employed full-time to pursue these subjects can absorb it all. I'm a couple of years behind in reading the dozen or so journals I subscribe to and don't even get some that I probably should. For example, I rarely read the quarterly, *Intelligence: A Multi-disciplinary Journal,* now in its 26th year. You can find its articles abstracted in Psychological Abstracts or in Current Index to Journals in Education which can be found in most university libraries and many city libraries.

• One problem of defining *intelligence* is, as Yale's Robert Sternberg has been saying, that it is defined quite differently in different cultures. Also, measurements may be influenced by environment. In a 1997 paper, Sternberg and Elena Grigorenko described probable effects of malnutrition and parasitic infection on "IQ" scores in Africa, cultural influences in Kenya and Russia, etc. Says Sternberg, "We can't assume that the cognitive skills we value or label as intelligence are those valued or labeled in another culture." You and I knew that, of course, but do we always keep it in mind when we debate these issues? Big question #1: Is there a possible definition of "human thinking" or of "human intelligence" that transcends cultures and applies to everyone? Big questions #2 and #3: Do we need one and, if so, why? One answer I'd expect to get is that, in multicultural countries like the U.S. (and there are many others), it would be impracticably expensive to develop and validate uniquely culture-relevant definitions and tests. Another answer is that we already have several well-validated non-language and "culture fair" intelligence tests. That's true, but I have to wonder if they are relevant where the very idea of intelligence testing is inconsistent with, or might even be considered intrusive in, a particular culture.

•E. Paul Torrance and Dorothy O. Sisk, both prominent names in education for the gifted, have recently published *Gifted and Talented Children in the Regular Classroom*. It's published by the Creative Education Foundation at $24.95.

•You may not know about a 1978 52-page pamphlet by Marsha Correll, *Teaching the Gifted and Talented*, published by the Phi Delta Kappa Educational Foundation at $1.25. Perhaps 1978 seems a long time ago, but much of this pamphlet is still useful. Also, it probably still represents the thinking in some public schools. Phi Delta Kappa is a national educators' society that publishes *The Phi Delta Kappan*, a very useful source of information on current issues and controversies in public education.

•Sir Cyril Burt (1883-1971) was a distinguished British psychologist who was involved with origin of Mensa. His most publicized research was into the heritability of intelligence using data on twins reared separately. His research reports, which concluded that mental ability is about 50% inherited, landed him in a lot of hot water including charges of fraud by inventing data. The dispute began in 1973, when Leon Kamin, then at Princeton, claimed to have found discrepancies in Burt's data. It caused a furor in the press and among psychologists. Robert B. Joynson's 1989 book, *The Burt Affair*, and Ronald Fletcher's 1991 book, *Science, Ideology and the Media*, re-examined Burt's data and found no evidence of fraud. In 1995, N.J. Macintosh published *Cyril Burt: Fraud or Framed*. It was reviewed by Franz Samelson in *Contemporary Psychology* (Vol. 41, 1996). Then, in a letter to *Contemporary Psychology* (Vol. 42, 1997), J. Phillippe Rushton, Univ. of Western Ontario, wrote a scathing criticism of Samelson's views. The debate continued in the August 1998 issue of *Contemporary Psychology* (Vol. 43), with two letter exchanges between N. J. Mackintosh and J. Phillipe Rushton. As for me, I believe Burt's and quite a lot of subsequent research has adequately established that at least the "general mental ability" (which Spearman labeled simply *g*) is heritable. That idea is, of course, politically and/or scientifically unacceptable to some. Although there are many more specific factors, such as math aptitude, verbal ability, etc., all attempts to measure intelligence seem to end up containing a large amount of *g*.

•Is there actually a gene for *g*? Well, if you understand the brief quote that follows, you may want to read an article by M. J. Chorney, et al, "A quantitative trait locus associated with cognitive ability in children," *Psychological Science*, May 1998. "A DNA marker in the gene for insulin-like growth factor-2 receptor (IGF2R) on Chromosome 6 yielded a significantly greater frequency of a particular form of the gene (allele) in a high-g group (.303; average IQ = 136, N = 51) than in a control group (.156; average IQ = 103, N = 51)."

•We sometimes need to remind ourselves that intelligence tests are intended to measure only potential for accomplishment. Psychometricians call "IQ" tests aptitude tests. They call measures of accomplishment of

specific abilities proficiency tests (e.g., licensing tests for pilots) or achievement tests (e.g., the final exam for Algebra 101). Having a high "IQ," as most Mensans have learned from some of their fellow Mensans, does not necessarily guarantee intelligent behavior. Dr. Abbie Salny, Supervisory Psychologist for both American Mensa, Ltd. and International Mensa, has delighted many an audience with her collection of hilarious tales of dumb things bright people do.

•Dr. Ellen Winner, featured in this issue of *MRJ*, is married to Dr. Howard Gardner of "multiple intelligences" fame (see his 1983 book, *Frames of Mind: The Theory of Multiple Intelligences*). Just imagine the dinner-table conversations. On August 14th, 1998, at the American Psychological Association convention in San Francisco, Dr. Gardner gave a progress report on his current research into "Humane Creativity" or more simply, "Good Works." His present inquiries are into people who are: (a) skilled, (b) innovative and (c) responsible. "Let me unpack that word *responsible*," he said. He went on to say that *responsibility* has four levels: (a) to one's self and one's goals; (b) to intimates such as family and friends; (c) to one's vocation, profession, bosses, etc.; and (d) to the wider world, society etc. "These levels of responsibility develop in order as we mature." In one project, he has been exploring how young athletes and artists make decisions when caught in the dilemma of dividing their time between the demands of extreme competition and responsibility to family, friends, and the larger public good. In another he is interviewing people young and old in three quite different disciplines, Journalism, Genetics and Music, looking for common factors that seem to guide career and other decisions at middle age. "One of the most important problems of our age," says Gardner, "is the loss of meaning of the word *responsibility*, which in earlier times used to amalgamate all four levels without differentiating them." (That may be an inexact quotation from my scribbled notes.) I wish him good luck.

•On August 18th, Dr. John Feldhusen, recent recipient of the Mensa Education and Research Foundations' award for lifetime achievement, spoke on "Talent Development, Expertise, and Creative Achievement." I tried to get his paper for the MRJ but he told me he already had plans for publication. I'll report here only his remarks about the term *gifted*. He has decided to try to abandon that term as "counterproductive these days." He has several concerns about the word *gifted*. One is that "it connotes mature ability." Another is that labeling a child as gifted can make a child feel he or she must look that way all the time. Yet another is that the term implies multipotentiality which is not necessarily true. Furthermore, there's a tendency to think of giftedness "as a binary entity" when in fact there are degrees of it and the term discourages greater specificity in describing a child's individual capabilities. "There is also [excessive] reliance on intelligence tests in the United States to identify or select youth for special programs, but our major concern should be to identify youth's current achievement levels in specific talent areas...."

He hasn't yet decided what term to use instead of *gifted*, but tentatively suggested that "*Talented* may be the better metaphor," cautioning that it should be used only to refer to a particular "domain specific" aptitude such as for math or art or whatever. He defines *talent* as "a complex of genetically influenced and environmentally determined aptitudes, skills, and personal characteristics that are seen by the culture and tradition as valuable to society.... It is a performance complex that is either emerging or full blown...."

Feldhusen is right, of course, that the words we use often determine the way we think about a subject and that the term *gifted* has probably carried too heavy and ambiguous a burden. It needs to be "unpacked", to use (Gardner's felicitous wording. I have to wonder, though, why Feldhusen chose to use *talented* (with his own redefinition) instead of just speaking of *having an aptitude* in some domain. Could it be simply because he searched only for a replacement adjective and that English doesn't have the adjective *aptitudenous*?

For a while I seriously considered eschewing the word *gifted* and substituting *talented* in all my writings. I sensed two problems though. One is that I'd always have to remind readers that I was using *talented* with Feldhusen's special definition. The other is that the English language has a life of its own which is rarely influenced by decrees by one or two writers. I'll continue to use *gifted*, but also try to keep Feldhusen's concerns in mind.

•There is a useful newsletter you can get merely for the asking. Write to: University of Connecticut, The National Center on the Gifted and Talented, 362 Fairfield Road, U-7, Storrs, CT 06269-2007. Their Spring 1998 newsletter contains, for example, an article on evaluating a school's program for the gifted and a report of a survey on such programs that concludes, not surprisingly, that "...professional development practices in gifted education provided to classroom teachers...are limited in nature, degree and scope." Another article deals with "twice-exceptional" children who are both gifted and learning disabled. It concludes "There are at least three subgroups of twice-exceptional students many of whom are not being properly served by the current educational system. The first group is students who have been identified as gifted yet are exhibiting difficulties in school. Students identified as learning disabled, but whose exceptional qualities have never been recognized or addressed comprise the second group, and students in general education classes and are considered unqualified for services provided for students who are gifted or have learning disabilities make up the third group."

•There are several sources of information on gifted students, including those with learning disabilities. One is LD ONLINE. It's at www.ldonline.org. As I write this, it has an article by Dawn Beckley, "Gifted and Learning Disabled: Twice Exceptional Students." Another is The Center for Creative Learning, www.cclkids.org/default/id/treas_comp.htm. This one has links to other relevant sites and much more.

•A perennial debate in education and political circles is whether gifted students should be placed in separate instructional tracks or "mainstreamed." There's a lot of literature on this issue. One research report that recently crossed my desk is by Lynn S. Fuchs and three others at Peabody College, Vanderbilt University. It's in the Summer 1998 *American Educational Research Journal*, and has a title, "High-achieving students' interactions and performance on complex mathematical tasks as a function of homogeneous and heterogeneous pairings," that almost defies you to read it. So don't. Though the writing style is less turgid than many such reports, it's still fairly represented by the pedantic title. I'll boil it down for you now. Fuchs, Fuchs, Hamlett and Karns ran an experiment with 3rd and 4th graders in several schools in which high-achievers in math (well, actually arithmetic) were sometimes paired with other high-achievers and sometimes with low-achievers working as pairs on complex problems. Their purpose was to find out how pairing high achievers with other high-achievers or with lower achievers, influenced the high achievers' "dyadic interactions and mathematics performances." Unfortunately, the experiment was ineptly designed and/or conducted and didn't reveal much. They admit, "We did not examine the effects of ability group composition on student learning, so no conclusions about how much high achievers learn as a function of working with other high- or low-performing classmates can be drawn." Well! So why do I mention this study at all? Several reasons: (1) as evidence that at least some kind of effort is being devoted to research on the advantages and/or disadvantages of ability grouping *vs.* mainstreaming of the gifted; (2) as evidence that it is not always done as well as we might like, and (3) because, despite its flaws and very small number of experimental subjects, the study is honestly reported warts and all, and did come up with some interesting conclusions. I'm not doing justice to the detailed data in the study by Fuchs, *et al*, but it does seem to support the contention that 3rd and 4th grade high achievers in arithmetic do higher quality problem-solving when paired with other high achievers. You think that's obvious and trivial? Not so. Those of us who are concerned about the optimum educational opportunities for the gifted need every citation we can find to oppose those who claim the gifted kids profit educationally from assisting the less able. Perhaps, as has been advocated, they gain culturally or otherwise from such experiences but I've never seen any solid research that demonstrates it. Fuchs *et al* conclude their report this way:

> It appears that high achievers, when working on complex materials should have ample opportunity to work with fellow high-achievers so that collaborative thinking as well as cognitive conflict and resolution can occur. Results suggest that it may be important for teachers to consider when and how heterogeneous pairings contribute to student learning. It appears that heterogeneous groupings may be used appropriately with less complex tasks, by providing maximal opportunities for high achievers to

construct and low achievers to profit from well-reasoned explanations. In addition, teachers might consider developing strategies for helping high- and low-achieving students work together productively on more complicated problem-solving activities. Clearly, future research should explore the possibility that, with explicit training, children can be prepared to work collaboratively, constructively, and profitably in heterogeneous groups on complex tasks.

Permit me to act the curmudgeon role for a moment. If the school requires that the high achievers teach the low achievers, that's okay by me as long as they get paid for it. Then there's the little matter of the significance of the Teacher Credential. Okay, I hear you, it's always done under the supervision of a qualified teacher. All right, don't think about it any more.

No, wait! *Do* think about that last sentence in the quotation. I'll repeat it, adding some emphasis. "Clearly, future research should explore the possibility that, *with explicit training*, children can be prepared to work collaboratively, constructively, and profitably in heterogeneous groups on complex tasks." You might have chosen some other phrase to italicize.

– F. C.

Spearman Revisited: Contemporary Views of *g*

Ian Dennis and Patrick Tapsfield (Eds.)
Human Abilities: Their Nature and Measurement
Mahwah, NJ: Erlbaum, 1996. 189 pp.
ISBN 0-8058-1800-6. $45.00

Review by Milton J. Dehn

Ian Dennis, head of the Department of Psychology at the University of Plymouth (England), is coauthor, with P. Jagodzinski and S. Holmes, of "User Acceptance of a Knowledge Based System for the Management of Child Abuse Cases" in D. Berry and A. Hart (Eds.) Expert Systems: Human Issues *and, Faith D. Besner and E. Davelaar, of "Phonology in Visual Word Recognition: Their Is More Two This Than Meats the I" in D. Besner, T Waller, and G. MacKinnon (Eds.)* Reading Research: Advances in Theory and Practice *(Vol. 5). •Patrick Tapsfield, acting head of the Human Assessment Laboratory at the University of Plymouth, conducts research and development of computer-based cognitive tests anal testing systems.• Milton J. Dehn is assistant professor of psychology and director of the school psychology program at the University of Wisconsin — Ida Crosse.*

Psychologists have debated the nature and structure of human intelligence for most of the 20th century. Much of the controversy has centered around the construct of general intelligence (*g*) advocated by Spearman (1927). Dennis and Tapsfield have assembled 10 experts on intelligence and cognitive processes to reexamine *g* from current psychological perspectives. The result is a well-balanced and thought-provoking work that should lead to a better understanding, by specialists and non-specialists alike, of the structure of intelligence and of the nature of Spearman's general factor.

Arising out of a seminar held at the University of Plymouth in 1993, the book is "organized around the theme of revisiting issues raised by Spearman's seminal work and considering the progress that has been made on them since 1927" (p. xi). Another one of the book's themes is to consider the contributions of cognitive psychology to the issues raised by Spearman. It may surprise readers to learn that models of human information processing and *g* seem quite compatible.

Reprinted from *Contemporary Psychology*, 1997, Vol. 42, No. 11.

Much of the volume's discussion focuses on finding supportable explanations of *g*, not so much on reviewing the evidence for or against the existence of *g*. Spearman explained the *g* factor simply as "mental energy" that could be transferred from one mental operation to another. However, some of the authors provide more sophisticated and up-to-date hypotheses to account for *g*. Some of the chapters emphasize how cognitive psychology and the information processing model broaden our usable understanding of *g*. The volume also includes discussions of factor-analytic evidence, the relationship between modes of attention and cognition, latent trait modeling, item response theory, the usefulness of *g* in occupational selection, and an examination of aptitude-treatment interaction by Sternberg. In addition, there is a chapter about the impact of cultural, ecological, and contextual factors on the development of human cognitive abilities.

Because Spearman's contribution was based on factor-analytic studies, it is appropriate that the lead chapter by Carroll considers the evidence gleaned from Carroll's (1993) thorough review of more than 460 datasets found in the factorial literature on intelligence. Carroll's evidence for a three-level theory of cognitive abilities is compelling. At the top of his hierarchical model is general intelligence, pretty much as it was conceptualized by Spearman.

One of the most intriguing chapters provides evidence that *g* may actually be working memory capacity. What Spearman referred to as limitations in "mental energy" are now thought to be limitations in working memory capacity. The chapter by Kyllonen on working memory firmly ties Spearman's 70-year-old ideas to modern cognitive psychology. Kyllonen proposes that Spearman's general factor may be what information-processing approaches describe as working memory capacity. This raises an exciting possibility because "the working memory capacity construct does not depend on factor analysis for its identification" (p. 73). However, Kyllonen's implication that reasoning ability may reflect little more than differences in working memory capacity is not as convincing.

In another chapter, Lohman provides more evidence that individual differences in working memory capacity may actually account for *g*, especially fluid *g*. Lohman reviews research that found a relationship between tests of spatial abilities and *g*. Tests of spatial abilities are among the best known measures of *g*. The major reason may be that spatial tests place extraordinary demands on working memory. Lohman suggests that "measures of *g* are largely unreliable measures of the ability to generate and transform different types of mental models in working memory" (p. 110).

In addition to the view that intelligence is primarily due to individual differences in working memory capacity, two other views that have some empirical support are expressed in this work. The first is that metacomponent processing is the primary basis of intelligence. The second

is that attentional resources may account for the positive correlations always found among different cognitive tests.

This volume also includes a brief but informative discussion of cognitive measurement applications in educational and occupational settings. The enduring importance of *g* in the prediction of occupational criteria is examined. According to Ree and Earles, there is little beyond the measurement of *g* that is useful in occupational selection, and non-*g* portions of tests, such as the Armed Services Vocational Aptitude Battery, "have been found to add little validity beyond *g* in prediction of training success" (p. 158).

Although the selections refer to many current conceptions of intelligence, the range of material is narrow. Clearly, the volume is an attempt to add to our understanding of *g*. Contemporary cognitive theorists who find the notion of *g* irrelevant are not as well represented: for example, there is no mention of Gardner's theory of multiple intelligences. College instructors and readers interested in a broader sampling of theories of intelligence might refer to a recent work by Flanagan, Genshaft and Harrison (1997).

In spite of its narrow focus, the authors raise many pertinent questions about the essence of human cognitive functioning. For example, Howe's discourse delves into the conceptual problems associated with the identification of elusive mental abilties and processes, and Berry argues that we need to "build a more culturally relevant, more comprehensive and less ethnocentric conception of human cognitive functioning" (p. 25).

This volume is well worth perusing because it updates the discussion of issues related to general intelligence. Those who are especially interested in the structure of intelligence will find it to be a valuable addition to their library. The book accomplishes its objective. Readers should be left with a broader and deeper understanding of just what *g* may entail. However, this book will not resolve the enduring controversy over the nature and structure of cognitive abilities. In fact, it may raise additional questions and expand the debate.

The message conveyed by the editors and by most of the contributors is that Spearman's work was only a first approximation, but it was a truly seminal work. His conception of intelligence has, for the most part, stood the test of time. This publication makes a convincing case that the construct of *g* is still very relevant.

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Exceptionally High Intelligence And Schooling

Ellen Winner
Boston College and Harvard Graduate School of Education

Exceptionally intelligent children differ qualitatively from their peers and often are socially isolated and under-challenged in the classroom. Research on educational options for these children shows existing programs to be effective. Little money is spent in the United States on education for gifted children, and distribution of special programs varies widely, with nonurban areas and disadvantaged children being the least likely to receive special services and with the most common option being the weakest one—the pullout program. There is a growing movement to disband existing programs. Instead of calling for more of the existing programs, it is argued that first, standards should be elevated for all children. Those children who still remain under-challenged should then receive advanced classes in their domain of ability. Thus, fewer children would be identified as being in need of special services, and those identified would be the more profoundly gifted children who would receive the strongest kind of intervention.

Stories about Jonathan Estrada have appeared off and on in the national news, describing a young child with extraordinary abilities. Jonathan began to talk at nine months; by two-and-a-half years of age, he was reading at the second-grade level and speaking with an eight-year-old's vocabulary. At age seven, he had an intense intellectual curiosity and a passion for geography (Nieves, 1996).

When Jonathan was five years old, his parents tried to get him admitted into the gifted-and-talented program in their local school district. Jonathan refused to complete the necessary IQ test because he was upset that he was asked to do "easy" things with blocks. When his mother tried to explain to the school officials that he found the test too easy, they told her that there was nothing wrong with the test and that she probably had an inflated view of her child's intelligence. Had Jonathan been accepted into the program, he would have had two hours a week of "enrichment" activities outside of the regular classroom, activities designed for gifted children. Instead, his parents enrolled him in a school for gifted children, where he would get a challenging curriculum full time rather than once or twice a week.

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When children like Jonathan reach school age, their parents face a crisis. It is difficult for schools to meet the needs of children who are so out of step with their age-mates in their abilities and interests. What educational choice is most likely to ensure that Jonathan will fulfill his intellectual potential? Should he be placed in a regular classroom so that he is with his age-mates? Would a two-hour enrichment program be an adequate way to deal with his special needs? Should he skip grades so that he is with his mental-age peers, even if that means he is many years younger than his classmates? Should schools have special classes for such children?

The difficulty Jonathan's parents faced in finding an appropriate school did not evoke sympathy in others. Most people thought the parents were bragging and suspected that Jonathan's prodigious abilities had been artificially created by pushy parents. This kind of reaction reflects people's deep-seated ambivalence about intellectual giftedness, arising perhaps from an anti-intellectual strain in American culture (de Tocqueville, 1945) as well as from America's democratic antielitist tradition, which leads to fear of hierarchies as a threat to the egalitarian American dream (Hofstadter, 1963). Although the belief that all people should be treated the same way is one way of interpreting the democratic ideal, another interpretation is that each person should be helped to fulfill his or her individual potential. These two interpretations of democracy lead to clashing visions of how exceptionally intelligent students should be educated.

Gifted Children in Regular Classrooms

Exceptionally intelligent students (hereafter referred to as gifted students) face a variety of problems in ordinary classrooms. They often are ostracized as being different and weird and are labeled as nerds and geeks (Silverman, 1993a, 1993b). In addition, they face the problem of boredom due to lack of an appropriate level of challenge (Csikszentmihalyi, Rathunde, & Whalen, 1993; Gross, 1993). Teachers often make little accommodation to the needs of these children, and many teachers have little or no special training in how to teach such exceptional children (Westberg, Archambault, Dobyns, & Salvin, 1993). A gifted child in the regular classroom may be the only such child in the room; hence, he or she will not have the opportunity to learn with others of like ability. When such classrooms have been observed, the gifted students generally have been bored and inattentive (Westberg et al., 1993). Meta-analyses have shown only modest benefits for

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Ellen Winner, Department of Psychology, Boston College, and Project Zero, Harvard Graduate School of Education.

Correspondence concerning this article should be addressed to Ellen Winner, Department of Psychology, Boston College, McGuinn Hall 301, Chestnut Hill, MA 02167. Electronic mail may be sent via Internet to ellen.winner@bc.edu.

this kind of instruction (Bangert, Kulik, & Kulik, 1983).

Many eminent adults report that school was a negative experience for them; they were bored and often knew more than their teachers (Bloom, 1985; Cox, Daniel, & Boston, 1985; Goertzel & Goertzel, 1962). Of course, the lack of appropriate control groups makes it impossible to know whether such negative reconstructions of school are typical of all children or are particularly typical of gifted children. Nonetheless, although one might expect children who lack intellectual interests to find school boring, it is particularly disturbing that the most able students often dislike school and feel they get little out of it. The lack of appropriate instruction for high-ability students is especially problematic for economically disadvantaged children whose families do not have the resources for extracurricular lessons, concerts, museum visits, and so forth.

The findings about gifted children and schooling, discussed below, are almost always based on research with scholastically gifted children and with those who are moderately gifted. Moderately gifted children are very different from profoundly gifted children, like Jonathan Estrada. Moderately gifted children perform one or two years above the level of their age-mates; in IQ terms, which is often how such children are classified, a moderately gifted child has an IQ between about 130 and 150, whereas a profoundly gifted child has an IQ of about 180 or above. Recommendations derived from research with moderately gifted children cannot be assumed to apply to profoundly gifted children because these two kinds of children are as different from one another as are moderately gifted from average children.

The Nature of Giftedness

Researchers and educators differ in how they define *giftedness*. Traditionally, researchers have defined giftedness as high general intelligence as measured by a high global IQ score (Hollingworth, 1942; Terman, 1925). Since then, arguments have been advanced for expanding and differentiating conceptions of giftedness. For instance, Sternberg's (1981, 1985, 1991) triarchic theory of intelligence allows for three very different kinds of gifts: analytic, synthetic, and practical. Davidson and Sternberg's (1984) theory makes insight central to scholastic giftedness: Gifted children excel at solving insight problems because they are skilled at selectively encoding information (sifting out what is relevant to solve a problem) and selectively combining and comparing information. Renzulli's (1978) theory defines giftedness not only in terms of high ability but also by task commitment and creativity; Getzels and Jackson's (1962) theory makes creativity a part of giftedness. And Gardner's (1983, in press) theory of intelligence, which consists of eight independent abilities (linguistic, logical-mathematical, spatial, interpersonal, intrapersonal, musical, bodily

kinesthetic, and naturalist), suggests that giftedness can occur separately in any one of these domains; this modular view of intelligence is inconsistent with a definition of giftedness in terms of general intelligence.

Because my concern here is with the problem of how gifted children should be schooled, I focus only on scholastic, or intellectual, forms of giftedness—that is, on giftedness in language, abstract logical thinking, and mathematics (in Gardner's [1983] terms, these would be gifts in the first two intelligences listed above; in other terms, these would be high-IQ children). Although children with artistic, musical, or athletic gifts also have special educational needs, America's schools do not even try to address these needs. Such children usually seek extra training outside of school (in the case of music and art) or in after school, extracurricular programs (in the case of athletics).

Theorists of intellectual giftedness differ not only in how they define giftedness but also in terms of whether they view gifted children as differing qualitatively or just quantitatively from average children. In a review of studies investigating the quantitative versus the qualitative question, Rogers (1986) identified the following areas in which gifted children (identified by high IQ) excel: (a) higher order thinking processes, such as recognizing problems and generating and monitoring solutions; (b) encoding, mapping, inference, and justification on analogical-thinking tasks; and (c) transferring skills to new problems and solving insight problems (Davidson & Sternberg, 1984; Sternberg, 1981). In addition, Rogers found that gifted children differ from average children in cognitive style: They are more likely to think independently, to take an active approach toward problem solving, and to persist at tasks; furthermore, they have less need than do average children for structure and adult scaffolding, and they score higher on self-efficacy and internal locus of control.

One could argue that the aforementioned differences between gifted and average children are simply quantitative. Jackson and Butterfield (1986) have argued that there is no evidence for qualitative differences: For example, gifted children use the same memory strategies as do average children, but gifted children simply use these strategies more efficiently. However, many of the studies showing no qualitative differences have been based on artificial tasks such as memory for letters in series (Jackson & Butterfield, 1986), and, for the most part, the gifted children in these studies have been moderately rather than profoundly gifted (as defined by IQ). Moreover, when differences are large, they may lead to qualitative differences in thinking. It seems quite reasonable to assume that although moderately gifted children may not think in a qualitatively different way than ordinary children, profoundly gifted children like Jonathan Estrada may well do so. There have been reports that profoundly gifted children as young as three or four years of age have induced rules of algebra on their own (Winner, 1996), have memorized

almost instantly entire musical scores (Feldman & Goldsmith, 1991) and have figured out on their own how to identify all prime numbers (Winner, 1996). Feats such as these just do not feel like faster variants of normal processes; they seem qualitatively different.

I think it is useful to suggest two ways in which profoundly gifted children may think qualitatively differently than average children. One way in which they seem different is suggested by the aforementioned examples: their ability to intuit solutions to challenging problems without help and their striking memories for complex information in their domain. A second way in which they are different is in their passion, their "rage to master," and their intrinsic drive to immerse themselves in a domain (Winner, 1996). These children often cannot be torn away from work in their domain of ability, and they achieve flow by setting challenges for themselves (Kanevsky, 1992).

It should be noted that when educational interventions for scholastically gifted children are being considered, it is important to distinguish between moderately and profoundly gifted children; it also is important to distinguish among kinds of scholastically gifted children (e.g., those who excel in creativity and imagination and those who excel in analytic ability, speed of learning, and memory). Educational options that are ideal for one kind of scholastically gifted child may not work for children with other kinds of scholastic gifts.

Indications of Scholastic (or Intellectual) Giftedness

Moderately as well as profoundly gifted children show early signs of being exceptional. Some of the indications of intellectual giftedness in infancy include long attention spans, good recognition memory, preference for novelty, over-reactivity to sensations, and early onset of language (Bornstein & Sigman, 1986; Fagan & McGrath, 1981; Lewis & Brooks-Gunn, 1981; Piechowski, 1995). Indications of the unusual learning styles of these children also emerge early: They show intense curiosity, persistence, drive, obsessive interests, and a metacognitive awareness of their problem-solving strategies, making it possible for them to transfer strategies to new and unfamiliar problems (Kanevsky, 1992; Rogers, 1986; Shore & Kanevsky, 1993). School-related abilities also emerge early: Many (although not all) read one or more years before entering kindergarten, demonstrate a fascination with numbers and numerical patterns, and excel at abstract logical thinking (Jackson, 1992; Krutetskii, 1976).

These children differ socially and affectively in three major respects from the norm. First, they are more likely to be solitary and introverted than are typical children. They like playing alone because they are stimulated by their own minds. When they do play with others, they prefer older

children, for obvious reasons, but they have difficulty finding like-minded peers of any age with whom to play (Albert, 1978; Csikszentmihalyi et al., 1993; A. Gallagher, 1990; Janos & Robinson, 1985b; Silverman, 1993b; Storr, 1988). Perhaps because of their sense of isolation and sometimes because of their ostracism, children who are extremely gifted have a rate of social and emotional problems about twice as high as that of average children; more moderately gifted children with less extreme abilities seem to have a slightly lower than average rate of emotional difficulties (Janos & Robinson, 1985b). In one study comparing popular and unpopular gifted children, Cornell (1990) found that these two groups did not differ in academic achievement. However, he noted that the achievement tests used may not have been sensitive enough to pick out profoundly gifted children. In addition, he reported that several children in the unpopular group had IQs higher than 148. Thus, it does appear likely that with extreme levels of ability, social and emotional problems can develop (Hollingworth, 1931, 1942).

Second, these children are often fiercely independent and nonconforming (Janos & Robinson, 1985b; Silverman, 1993a, 1993c; Winner, 1996). And finally, these children are intrinsically motivated to achieve mastery, they derive pleasure from work, and they often have high self-esteem about their intellectual capacities (Bloom, 1985; Csikszentmihalyi et al., 1993; Gross, 1993; Janos & Robinson, 1985b). Those children whose families combine nurturance and stimulation appear to be most likely to remain motivated to achieve, and those who persist in their area of ability report being more engaged and satisfied in high school (Csikszentmihalyi et al., 1993). Some very highly gifted children underachieve, however, often because of lack of appropriate challenges in school. Underachievers are not motivated, and they develop low self-esteem about their intellectual capacities (Butler-Por, 1987).

This picture of giftedness does not, of course, fit all gifted children. To begin with, many eminent adults were late bloomers (Darwin is an oft-cited example) who did not show many of these signs in childhood (Simonton, 1994). As children, their gifts were hidden. In addition, many children present a more one-sided, uneven profile of giftedness. Although many gifted children are globally gifted in the academic realm and balanced in their intellectual skills, it appears that at least as many, if not more, gifted children have a domain-specific gift in either language or mathematics (Benbow & Minor, 1990; Detterman & Daniel, 1989; Mueller, Dash, Matheson, & Short, 1984; Silver & Clampit, 1990; Wilkinson, 1993). For instance, among a thousand intellectually gifted adolescents, more than 95% showed a sharp disparity between their mathematical and verbal abilities (Achter, Lubinski, & Benbow,1996). And a study of intellectually gifted middle school students revealed three separate kinds of gifts: linguistic, logical-mathematical, and social (D. J. Matthews & Keating, 1995). The kinds of memories and information-processing skills possessed by mathematically

gifted children are different than those possessed by verbally gifted children (Dark & Benbow, 1991). Thus, educational interventions need to be tailored to the kind of gift the child possesses. Mathematically gifted children should not be treated the same way as linguistically gifted children. In addition, gifted children who are highly creative and imaginative may benefit from certain kinds of educational interventions, whereas those who are highly analytic or who excel in memory and speed of learning may benefit from other kinds of educational interventions. In short, there are different kinds of intellectual gifts; hence, there must be different kinds of interventions.

Gifted children also may possess a combination of intellectual giftedness in one area and learning disability in another. A common combination is a gift in a spatial area as well as a language-based disability such as dyslexia (Feiring & Taft, 1985; Fox, 1983, Reis, Neu, & McGuire, 1995; Yewchuk, 1985). Students with a combination of gifts and disabilities face particular problems in school: They are excluded from gifted programs (their unevenness can lower overall IQ scores) but are considered too smart for remedial education (Reis et al., 1995). And because they excel in some areas, teachers sometimes write them off as simply being unmotivated.

The Lifetime Course of Giftedness

It is tempting to argue that intellectually gifted children need special schooling so that they can become eminent and creative geniuses as adults. The development of any kind of gift is a long-term endeavor, fostered by early identification, supportive and encouraging parents, and teachers who are at first nurturant and later demanding and tough (Bloom, 1985). However, most gifted children do not grow into eminent adults and do not ever make major contributions to the way people think about a particular domain (Richert, 1997). The lack of correlation between childhood giftedness and adult eminence was first revealed in Terman's longitudinal study of high-IQ children (Terman & Oden, 1959). Most of the participants in this study grew up to be successful but not major creators. And those participants with IQs of 170 or above were no more likely to become eminent than were those with lower IQs (Feldman, 1984). Above the level of 120, IQ cannot predict adult eminence (Barron & Harrington, 1981; Guilford, 1967). And the correlation between school achievement and eminence is either zero or only weakly positive (Cohen, 1984; Hudson, 1958; McClelland, 1973).

There are many reasons why childhood giftedness does not typically grow into adult eminence. Eminence requires drive, and although gifted children are driven, not all of them persist in the kind of hard work that is one of the preconditions for achieving eminence (Ericsson, Krampe, & Tesch-Romer, 1993). Eminence requires creativity, dissatisfaction with the

status quo, and a desire to shake things up, and these personality traits are not necessarily reflected in high academic achievement or high IQ (Gardner, 1993). Eminence also is associated with higher than average rates of psychopathology (Eysenck, 1995; Jamison, 1993; Ludwig, 1995, Simonton, 1994). Perhaps the high-IQ children in Terman and Oden's (1959) study did not achieve eminence because to be admitted into the study, they first had to be nominated by their teachers, a procedure that may have weeded out odd children with psychopathological tendencies (Simonton, 1997). Finally, extremely gifted children may have social and emotional difficulties, as mentioned above, and these difficulties can lead to maladaption and dropping out. Numerous individual case studies of maladjusted prodigies exist: One famous case is that of William James Sidis, a math prodigy who dropped out of math after graduating from Harvard University at age 15 (Montour, 1977).

The Case for Special Education for Gifted Children

Although the most appropriate kind of schooling cannot ensure that intellectually gifted children become eminent adults, for some of the reasons just cited, it is certainly likely that inappropriate schooling, in which instruction is not matched to children's needs, will result in less than optimal intellectual development (as well as an unhappy school experience). The most gifted students in the United States perform far worse than high-ability students in other countries, and about half of the top U.S. students (in the top 5% of the IQ range) are underachieving (Reis, 1994; VanTassel-Baska, 1991). Although international comparisons suggest that most U.S. children are underachieving because at all ability levels they perform poorly as compared with the children in many European and East Asian nations (Stevenson, Chen, & Lee, 1993; Stevenson, Lee, & Stigler, 1986; Stevenson & Stigler 1992), the gap between potential and performance is probably the greatest for the most gifted children (Ross, 1993). Thus, the most intellectually gifted students are the most under-challenged group, and cross-cultural comparisons suggest that these students could be performing at a far higher level.

If America's democratic ideals are interpreted to mean that each child should receive an education that matches his or her intellectual needs, then it is clear that children like Jonathan should not be placed in ordinary classrooms. Whether more moderately gifted children should be placed in ordinary classrooms is a matter for more debate and is a question I address later in this article.

Existing Options for Gifted Children

Schools have considered and attempted a variety of options for educating children who are years ahead of their peers in abilities and interests. In the first half of the 20th century, a few special schools for gifted children existed, but it was far more common to accelerate gifted children than to group them together (Kulik & Kulik, 1997). The movement to establish formal "gifted programs" in which gifted children of the same age are grouped together began in reaction to Sputnik in 1957 (Tannenbaum, 1993).

Policies for educating gifted children are determined by states; thus, they vary considerably. During the past 25 years, the number of programs for gifted children offered by the public school system has grown considerably. According to a federal report in 1972, only 4% of gifted children were getting any kind of special service (Marland, 1972), and 20 years ago, only 7 states had legislation and funding for gifted education (Ross, 1993). However, by 1990, 38 states served more than two million gifted children in Grades kindergarten through 12; the other 12 states did not report figures, but every state offers some programs. According to the 1988 National Education Longitudinal Study, 75% of 8th graders in public schools had some opportunities for gifted education, and almost 9% of 8th graders in public schools participated in some gifted-and-talented programs (Ross, 1993). However, selection for such programs was unevenly distributed across ethnic backgrounds (18% of Asians, 9% of Whites, 8% of African Americans, 7% of Hispanics, and 2% of Native Americans were selected) and income levels (only 9% of identified children came from the bottom quartile of family income in contrast to 47% from the top quartile). In addition, school districts in small towns and rural areas had the fewest such programs (Ross, 1993). The federal Jacob K. Javits Gifted and Talented Students Act of 1988 was passed to address this disparity: The act provides support for research on gifted education, with priority given to efforts to serve gifted children with economic disadvantages or with disabilities.

Although the number of gifted programs has grown dramatically since the 1970s, only 2 cents out of every 100 government dollars allocated for education are spent on gifted programs (Ross, 1993). The number of children participating in some kind of gifted school program is also only about half the number of children participating in some kind of special program for children with disabilities. According to a report by the U.S. Department of Education (1996), in the 1993-1994 school year, 6% of children in Grades kindergarten through 12 in public schools participated in some gifted program, as compared with 12% of children ages 0-21 years who were enrolled in federally supported programs for disabled persons (a category that includes, among other things, individuals with learning disabilities, mental retardation, and emotional disturbances).

Today, there is a growing movement to disband special programs for gifted children (Purcell, 1993; Renzulli & Reis, 1991). The arguments for and against gifted programs are polarized and bitter, and sharp clashes occur between those in favor of ability grouping and those who see it as racist and elitist and who argue for heterogeneous grouping with cooperative learning and between those in favor of grade skipping and those who insist that such acceleration stunts children's social development and robs them of a normal childhood. Even among those who favor special education for gifted children, disagreements form between advocates of enrichment and advocates of acceleration and between those who favor grade skipping, which means placing a gifted child with nongifted older children, and those who promote ability grouping, which means grouping together gifted children who are similar in age. There is no unified approach to gifted education in the United States, which is not surprising given that there also is no unified approach to education in general, no national standards, and no central educational philosophy. Various kinds of services for gifted children can be found in school districts, although many schools have no services at all and only some programs have been adequately evaluated. Next, I describe the major kinds of approaches and review the evidence for the effectiveness of each type.

It is useful first to distinguish between two broad classes of programs: (a) those that supplement education in the regular classroom and thereby help to improve a gifted child's educational experience and (b) those that make fundamental alterations. In the former category are pullout programs (the most common kind of elementary school gifted programs) and out-of-school summer (and sometimes weekend) programs for children selected by talent searches. In the latter category are full-time ability grouping—clustered within a regular classroom, in a special classroom, or in a special school—and acceleration in the form of early school entrance, grade skipping, and courses taken at an above grade level without grade skipping. With some exceptions, including the talent searches for out-of-school programs, gifted children are typically selected for special programs on the basis of global test scores (whether IQ or some other aptitude test).

Programs That Supplement

Pullout Programs

Most children selected for gifted programs spend the bulk of their time in regular classrooms but are pulled out for up to several hours a week to participate in programs for gifted children. Seventy-two percent of elementary school districts have adopted this kind of solution for gifted

children (Ross,1993). These children are identified on the basis of global IQ scores (the cutoff may be 130 or somewhat lower) or by some other kind of aptitude or achievement test. Often, other measures such as teacher recommendations and checklists also are used. For the most part, participants are moderately, not profoundly, gifted.

Pullout programs, often called enrichment programs, come in a number of varieties. Schiever and Maker (1997) identified three kinds: (a) Process-oriented programs teach creative problem solving and critical thinking but often not in the context of any particular kind of subject matter, (b) content-oriented approaches offer minicourses or mentorships in a specific subject area, and (c) product-oriented approaches involve students in projects culminating in reports and presentations.

One of the most widely used approaches to pullout education is the schoolwide enrichment model (SEM) developed by Renzulli and Reis (1997). SEM has three phases: exposure, the development of critical and creative thinking skills, and the opportunity to pursue a self-selected area of study. Children are identified by multiple criteria (including creativity and commitment). Up to 20% of children in a school may be admitted to Phase 1, and these children have been shown to do as well in Phase 3 as the top 3%-5% identified by traditional IQ measures (Renzulli & Reis, 1997).

Pullout programs have been criticized for generally not leading to the development of a systematic knowledge base in the area in which a child is gifted because these programs are not grounded in a particular subject area. For the same reason, they have been criticized for not being tailored to the student's particular area of giftedness. Informal research on these programs suggests they are not highly effective: Children often show poor recall of what they did in these sessions (Fetterman, 1988), and schools with such programs often are dissatisfied with them, dismissing them as too superficial and unsystematic (Cox et al., 1985; J. J. Gallagher, Weiss, Oglesby, & Thomas, 1983). The main problem seems to be that even the most exciting curriculum cannot accomplish much if students are exposed to it for only several hours a week. Thus, such programs are weak solutions to large problems (Feldhusen, 1997; Gagne, 1995; Winner, 1996).

Yet, these programs do have some positive effects. Children in these programs show moderately higher achievement gains on standardized tests as compared with children with equal abilities who are not in such programs (Delcourt, Loyd, Cornell, & Goldberg, 1994; Treffinger, Callahan, & Baughn, 1991; Vaughn, Feldhusen, & Asher, 1991). In Vaughn et al.'s study, for example, students gained in achievement, critical thinking, and creativity, and achievement gains were greatest when the curriculum in the pullout program extended that in the regular classroom. Evaluations of SEM have shown that participation in this program improved attitudes toward learning and helped underachievers and that students who went through all three phases remained interested in the same subject areas in college

(Renzulli & Reis, 1997). However, students in such studies were not always randomly assigned to an enrichment class; thus, some of the gains shown may have been due to preexisting ability. More important, it is probable that students of all ability levels would benefit from such programs. Thus far, there certainly is no evidence that they would not. Renzulli (1994) argued that the best features of enrichment programs should be taken (e.g., project-based learning) and infused into school for all children.

Talent Searches for Summer and Weekend Programs

A very different kind of selection for special programs was pioneered by Julian Stanley with the founding of the Study of Mathematically Precocious Youth (SMPY) at Johns Hopkins University. Students selected for this program were identified on the basis of a domain-specific achievement test rather than a high overall score on an IQ test or another aptitude test (which cannot predict the specific academic area or areas in which a student may excel). Middle school students were given an "out-of-level" test (the Scholastic Assessment Test [SAT] designed for college-bound seniors in high school) to qualify for fast-paced summer courses in which an entire year of a high school course is compacted into three weeks.

There are now four regional centers that conduct talent searches based on out-of-level SATs: the Center for Talented Youth at Johns Hopkins University (now a part of the Institute for the Advancement of Academically Talented Youth), the Talent Identification Program at Duke University, the Center for Talent Development at Northwestern University, and the Rocky Mountain Talent Search at the University of Denver. Many other local talent-search programs can now be found in every state and even in some other countries, such as China. Middle school students are eligible to participate in talent searches if they score in the upper 3% on a standardized achievement test (elementary school students qualify in the upper 5%). They then take the SAT. Many of these students do extraordinarily well. Twenty percent of these seventh graders do as well or better than average college-bound seniors (Assouline & Lupkowski-Shoplik, 1997; Center for Talented Youth, 1995).

Originally, the courses offered were in mathematics, but now courses in all areas of the curriculum are offered. About 150,000 students per year participate in these programs, which are mostly residential summer programs but sometimes are offered on weekends during the school year. Students who participate find the experience to be very positive, particularly because of the opportunity to have social and intellectual contact with like-minded peers, which for many of them may be a first-time experience (Benbow & Lubinski, 1997; Enersen, 1993).

Currently, SMPY is conducting a longitudinal study of 5,000 students who enrolled in these fast-paced courses (Benbow & Lubinski,1997; Lubinski & Benbow, 1994). Preliminary findings have shown that these students have maintained a positive self-concept about work and that 85% of the first cohort of SMPY graduated from college with excellent academic records. Thus, students as young as 13 can be identified as having high mathematical abilities and as being likely to go on to be high scholastic achievers. SMPY students also took advanced-placement exams earlier, were more likely to take college courses in high school, and attended more selective colleges than did students matched in gender and SAT scores who chose not to participate (Barnett & Durden, 1993). Thus, students who participate in these summer courses continue to be high achievers in high school and college. And the greatest benefit, in terms of a commitment to advanced courses, higher education, and a full-time career, has been for girls who took courses in math (Fox, Brody, & Tobin, 1985; Olszewski-Kubilius & Grant, 1994). One cannot conclude, however, that the high achievement of these students is causally related to SMPY participation, because those who chose not to participate in SMPY may have been less achievement oriented to begin with.

Programs That Make Fundamental Alterations

Ability Grouping in the Classroom

Classroom ability grouping for gifted children can take a number of forms. It can mean placing children in self-contained classes for gifted children, grouping high-ability children together within a classroom (or even across grades) for specific subject matters (cluster grouping), or placing children in schools designed only for gifted children.

Ability grouping is often confused with tracking, a term that evokes strong controversy. *Tracking* usually refers to the practice of assigning high school students to a college preparatory, general, or vocational track on the basis of career goals (Kulik & Kulik, 1997). Although students often choose the track that they prefer (Jencks, 1972), once they are assigned, it is difficult to move into a different track. Critics of tracking, such as Oakes (1985), have argued that such practice leads to segregation by class and race and that the curriculum for the low-tracked students is boring and unchallenging and is taught by the poorest quality of teachers. However, although Oakes showed that low-tracked students learned little, she did not have a control group of similar ability students who were not tracked. Would these students have learned more if they had been in a mixed-ability classroom? It is possible that the lower level of challenge may have been appropriate for the lower ability levels of these students.

Ability grouping is more flexible than tracking, as students can be readily regrouped when appropriate. In addition, grouping may occur only for specific subject matters or for the entire curriculum, as in self-contained classrooms for gifted children. Although ability grouping is also often attacked as being elitist and robbing lower ability students of high-achieving role models (R. Good & Brophy, 1993), it is surprising how common ability grouping actually is. Some form of within-class ability grouping is used in about 90% of elementary schools (McPartland, Coldiron, & Braddock, 1987), and most teachers favor some kind of ability grouping (National Education Association, Research Division, 1968; Slavin, 1989/1990; Wilson & Schmits, 1978).

Meta-analyses of evaluations of self-contained classes for gifted children have shown that ability grouping per se, without appropriate curriculum modifications, leads either to very minimal gains (Kulik, 1992; Kulik & Kulik, 1982, 1991, 1992) or to no gains at all (Slavin, 1987, 1990). But when curriculum is appropriately strengthened, the effects are quite positive. Kulik (1992) found that (a) the typical gain for gifted students in accelerated, ability-grouped classes was almost one year more on standardized tests than gains made by equivalentability students in heterogeneous classrooms and (b) the typical gain for gifted students in enriched, ability-grouped classes was about four to five months greater than gains by matched students in regular classrooms (see also Allan, 1991; Feldhusen, 1989; Fiedler, Lange, & Winebrenner,1993; Rogers, 1991, 1993, for research showing positive gains made by ability-grouped students).

Meta-analyses of within-class and cross-grade groupings by subject matter again show benefits. More than 80% of studies analyzed by Kulik (1992) reported a positive gain, and the average gain was two to three months greater than that made by equivalent students who were not grouped. Slavin (1987) also reported positive effects of such subject-matter grouping. Even students in middle- and low-ability groups apparently benefit but to a lesser degree (Kulik & Kulik, 1997). The argument that nongifted children will do worse because they lack the role models of the high-achieving students is thus not supported. Perhaps this is because high-ability students cannot serve as effective role models for those who do not feel similar enough to these students to try to emulate them (Schunk, 1987).

Critics of ability grouping argue that cooperative learning in heterogeneous classrooms is a fairer solution (Slavin, 1989/1990). But research demonstrating positive effects of cooperative learning is typically based on a comparison between a cooperative-learning classroom and a traditional classroom with a basic-skills orientation (A. Robinson, 1990a, 1990b, 1991, 1997). Thus, these studies cannot indicate what the effects are of cooperative learning per se on gifted children. Cooperative learning can, of course, be used in a heterogeneous or an ability-grouped classroom, and it is not known whether cooperative learning among equally high-ability

students is more or less beneficial than an individualistic approach. However, although most studies of cooperative learning have not looked separately at how this style affects gifted students, one study has shown that gifted high school students dislike cooperative learning, preferring both individualistic and competitive approaches (Li & Adamson, 1992). In addition, qualitative studies of gifted students in cooperative-learning groups report that these students are frustrated by having to explain concepts to uninterested students and feel that they do all of the work (Clinkenbeard, 1991; M. Matthews, 1992; Mulryan, 1992). Gifted students dominate in such groups, and lower ability students remain passive (T. L. Good, Reys, Grouws, & Mulryan, 1989-1990). Even some high-ability students become passive in such groups because they are bored or feel slowed by others (Mulryan, 1992).

Special Schools for Gifted Children

There always have been special schools for gifted children. Many private schools do not label themselves as such, but because they require achievement (or even IQ tests) for admission, they are, in effect, schools for high-ability students. Some private schools officially designate themselves as schools for gifted children and require IQ scores of at least 125 or 130 for admission. Public magnet schools for gifted children at the elementary and middle school level (such as Hunter College Elementary School in New York City) are rare, but state-supported high schools for gifted students are more common (e.g., Bronx High School of Science, Stuyvesant High School, Hunter College High School). In the 1970s, a number of state-supported residential high schools for juniors and seniors began to develop (see Cox et al., 1985; Eilber, 1987; Kolloff, 1997; Stanley, 1987). The North Carolina School of Science and Math, founded in 1980, has served as a model for such schools, and now a number of others have been founded (e.g., Texas Academy of Math and Science; Illinois Math and Science Academy; Louisiana School for Math, Science, and the Arts). These high schools are for the most highly gifted students— those for whom advanced-placement and honors courses in regular high schools are insufficient. Teachers at these schools are specialists in their subject area (often they have PhDs); classes are often longer than in regular schools; and students engage in independent, in-depth research. These schools have high-achieving students and typically place a large number of students in the annual Science Talent Search sponsored by Westinghouse (Stanley, 1987). At the Illinois Math and Science Academy, 33% of the students recently were National Merit semifinalists (Kolloff, 1997).

The successful outcome of the graduates speaks well for these schools. But no research has compared students of equally high ability randomly

assigned to such schools versus ordinary schools, and no such studies are likely. It seems unreasonable to suggest, however, that high-ability students would do just as well in less rigorous schools. Such a suggestion would mean that there are no benefits to being challenged by one's teachers and peers.

Acceleration

Acceleration can mean taking a fast-paced course (in a regular or special class), early entrance to school, or grade skipping. Although acceleration is often pitted against enrichment as an alternative approach to gifted education, this is not a necessary dichotomy—a class can be fast-paced and enriched (Davis & Rimm, 1994).

Grade skipping is one of the cheapest ways to accommodate gifted students, and evidence for the effects of modest acceleration is positive. Terman (1925) believed that gifted children should be allowed to skip several grades and enter college by age 16. He opposed more radical grade skipping for his high-IQ participants, fearing its negative social effects. Students in the Terman sample who skipped grades went on to achieve more in their careers (Terman & Oden, 1947). Of course, these are correlational data, and it is not known whether the grade skipping led to the achievement or whether the most able students chose to skip grades. But this comparison at least suggests that moderate acceleration is not harmful in the long run. As mentioned, Kulik (1992) showed in a meta-analysis that gifted students who were accelerated outperformed nonaccelerated students (matched in age and IQ) by one year on achievement tests. Many other studies have corroborated these conclusions (e.g., Brody & Stanley, 1991; Feldhusen, 1989; Janos & Robinson, 1985a; Rogers, 1991; Swiatek & Benbow, 1991).

But grade skipping has potential problems. The major concern is that it involves placing children with others who are more physically advanced and with others who are very different socially and emotionally. Schools often resist grade skipping for fear of causing social maladjustment (Gross, 1993; Southern, Jones, & Fiscus, 1989). Although some studies have reported no social or emotional problems for accelerated students (Brody & Benbow, 1987; N. M. Robinson & Janos, 1986), one study of girls in a residential early college entrance program reported an alarming amount of stress and depression (Cornell, Callahan, & Loyd, 1991). These findings do not show that acceleration causes problems, but they do suggest caution and the need to evaluate the individual child before deciding on whether he or she should be accelerated.

Acceleration also is based on the assumption that gifted children are not different but rather just faster than their peers, that is, just like older average children. Moreover, although many studies have shown positive effects of a

1- or 2-year grade skip, a profoundly gifted child like Jonathan, who was described earlier, would need a far more radical grade skip. This would mean placing him with children many years older (as in the much publicized case of Michael Kearney, who attended college between the ages of 6 and 10; Castro & Grant,1994). In addition, if profoundly gifted children are more likely to think in qualitatively different ways than older average students, then placing a 6-year-old prodigy with a 12-year-old average child may not accomplish the intended goal of grouping the prodigy with others of like ability. Grade skipping, then, seems to be a riskier solution for children with extreme levels of intellectual ability who would require radical acceleration. In addition, a gifted child who is very creative and imaginative might have more difficulty with acceleration than a gifted child who is not particularly creative but who is a rapid learner with an excellent memory. Assouline, Colangelo, and Lupowski (1993) pointed out the importance of evaluating the child for acceleration not only in terms of academic ability but also in terms of the child's social and emotional maturity and the child's own attitude toward acceleration.

Conclusions

Special educational programs for scholastically gifted students have been shown to have positive effects, and a strong case can be made that intellectually gifted students need more than what most regular classrooms in the United States can offer today. One major problem that gifted students face is that American schools hold low expectations for students in general and make minimal demands, as compared with, say, schools in many Western European and East Asian countries. In my view, if America's schools were able to be modeled on the more rigorous approaches in such countries, it seems likely that many of America's moderately gifted students, currently bored and languishing, would be appropriately challenged in regular classrooms. Perhaps it is for this reason that countries such as France and Japan, whose schools are more demanding than are U.S. schools, have far fewer gifted programs than the United States does. There is certainly evidence that when standards in classrooms are raised, many students, not just the brightest ones, rise to meet the challenge (Edmonds, 1982; Levin, 1987; Rutter, Maughan, Mortimore, & Ouston, 1979).

International comparisons also show that higher standards lead to higher achievement for all ability levels.

If the standards were raised for all students, I believe the gap between high- and low-achieving students would be narrowed. In my view, gifted education requires a two-pronged approach. First, standards for all students need to be radically elevated. If this endeavor were successful, then the children who still remained bored and under-challenged could be identified,

and they could be offered advanced classes. Instead of the term *gifted class*, the more precise and less precious term *advanced class* might be used. Students should be identified as needing advanced instruction in mathematics or reading, for instance, rather than be labeled as *gifted* in general.

Even with a more challenging curriculum, the research on ability grouping suggests that students at all levels would benefit from being so grouped. Ideally, students might be placed in flexible, non-age-graded ability groups for all subjects. Children in elementary school who need more advanced courses in a specific subject matter could take courses in middle school; those in high school could take college courses while still in high school. This recommendation for domain-specific, advanced classes also has been made by Stanley and Benbow (1986) and by Feldhusen (1993), who called for accelerated, enriched, challenging instruction in a child's particular talent area. Similarly, Renzulli (1994) argued for making the regular curriculum more challenging, forming enrichment clusters for children with similar interests, and also retaining special services for those at the highest level—services such as independent work and mentors. Furthermore, Ross (1993) recommended that all children be given more challenging material and be allowed to proceed at their own pace with flexible ability grouping.

In my view, young children do not need to be given an IQ test to determine what group they should be placed in. Instead, curriculum-based identification should be used. When children are given a challenging curriculum, high abilities make themselves visible (Ramos-Ford & Gardner, 1997). Teachers can look for signs of boredom, curiosity, drive, and a desire for more work. A 10-year-old boy whom I know, after quickly and effortlessly completing his homework one afternoon, turned to his mother and said, "I think I need more work!" I would take such a statement as a clear sign that this child needed a higher level of challenge. No IQ test would be called for. And groups can and should be flexible; children who are overwhelmed can be regrouped. The use of such curriculum-based identification seems more likely to lead to a fairer representation of minority and poor students in high-ability groups than there are now, given the problems that such students often have with paper-and-pencil tests (Richert, Alvino, & McDonnel, 1982).

But none of these alterations will help children like Jonathan Estrada. Profoundly gifted children are often under-challenged in gifted programs (including special schools for gifted children, which have many moderately gifted children) and do not find their appropriate level of stimulation until they reach college (Winner, 1996). Children like this will continue to need special classrooms or special schools.

When schools cannot or will not meet the needs of high-ability students, families can seek mentors for their children. Highly successful adults often report having had mentors who played a very important role in

their intellectual development (Bloom, 1985; Gardner, 1993; Kaufman, 1981), and mentors have been shown to play a particularly important role for disadvantaged students and for girls who enter traditionally male fields (Clasen & Clasen, 1997; McIntosh & Greenlaw, 1990).

Most researchers in the area of gifted education recommend identifying more students as gifted and providing more special services. Because the most common kind of special service is a pullout program, this recommendation can be taken to mean more of the same. In conclusion, I offer a different recommendation, one that does not represent the mainstream of those in the field of gifted education. I suggest that the expectations for all students be considerably elevated and that children be flexibly grouped by subject matter within regular classrooms. Furthermore, special full-time classrooms or special schools should be provided for those children who continue to be under-challenged despite the greater rigor.

This would likely mean that fewer children would be identified as being in need of gifted programming, because many more of the moderately gifted children would be appropriately challenged in regular classrooms if the curriculum were genuinely altered in favor of higher standards. Those identified would then be the more highly gifted children. This solution also would mean that children like Jonathan would not be taught in the same way as moderately gifted children. The difference between children like Jonathan and moderately gifted children should be recognized to be as great or greater than the difference between an average and a moderately gifted child.

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Review by Nancy M. Robinson Halbert Robinson Center for the Study of Capable Youth University of Washington

ELLEN WINNER — Gifted Children: Myths and Realities. New York: Basic Books, 1996, 449 pp., $28.00 hardback.

Ellen Winner has written a readable, charming, and at the same time very controversial book sure to ruffle feathers. Many readers, like this reviewer, will find themselves both loving and hating it. To cut to the punch line (as the author declines to do until page 273): "We are wasting what few resources we have for gifted education on the moderately academically gifted. We would do better if we elevated the level of instruction for all students and concentrated our gifted resources only on the extreme children, the kinds described in this book." The first sentence accurately reflects the disdain for children with (only) "moderate gifts" that permeates the volume. The second sentence is as detailed as Winner gets in describing her solution to the complex issues involved.

But this is a detailed and informative book, and it will break new ground for most readers. By far the best and most original chapters deal with development of prodigious (early, high-level) achievement in discrete domains such as art, music, chess, and mathematics. Using case histories of prodigies as well as savants, and bringing together a disparate and emerging literature about possible biological bases of precocity in these discrete domains, Winner brings new information to the general reader who is interested in giftedness. Her own research is primarily in the area of prodigious and creative development in the visual arts, and it is here that her expertise shows itself at its best. Her descriptions of young artists are entirely engaging, and she is very effective in her differentiation of the gifted artist from the savant, in her argument that giftedness in one discrete field need not be accompanied by giftedness in any other (apparently this is particularly true of artists), and in the lovely illustrative material she includes.

Winner defines *giftedness* as encompassing both talents in restricted domains such as music or art and abilities in broader domains such as verbal and mathematical reasoning. Her position closely resembles the similarly domain-centered, non-hierarchical theoretical framework of her husband, Howard Gardner (1983). (I did not, however, see the term *multiple intelligences* in the text or index.) Throughout the book Winner devotes more attention to discrete, encapsulated talents than to more academically

Reprinted from *The Journal of Creative Behavior*, 3rd Q. 1997, Vol 31, No. 3.

oriented abilities, as is probably natural, given her focus and experience. Even so, this reviewer questions the wisdom of equating advancement in restricted sets of skills such as chess playing with the more basic, flexible, and broadly applicable abilities usually subsumed under the terms *general intelligence*, or its major components, such as *linguistic* or *logical-mathematical intelligence*. Winner's devalued concepts of general intelligence and academic aptitude are revealed by her habitual use of IQ as their synonym, a habit that leads to occasional discussions of why IQ scores aren't necessarily reflective of IQ (e.g., pp. 177-178)!

Winner begins by limiting her use of the term *gifted* to apply to children who display three characteristics: they are precocious in an organized area of knowledge, that is, they begin to show unusual competence early and learn easily; they "march to their own drummer" by learning with minimal help from adults while creating their own strategies and discoveries; and they show a "rage to master" and state of "flow" when engaged with their domain. She probably chooses to use these as defining criteria of giftedness rather than as nonrestrictive descriptors because she is specifically interested in exceedingly precocious children who are in the course of pursuing, even obsessed by, very high-level goals.

Winner then introduces nine familiar "myths" or untruths, which she successfully debunks by the end of the book. The myths: most gifts are "global;" talent and giftedness are different phenomena; giftedness is synonymous with high IQ; biology or environment is responsible for giftedness; gifted children are "made" by overzealous parents; all gifted children glow with psychological health; all children are gifted; gifted children (all) become gifted adults. In some ways, debunking these myths represents her subtext.

But not really. Her real subtext is this: Extraordinary gifts are extremely precious. At all costs, they must be nurtured. Children with such gifts are poorly served by current specialized in-school and out-of-school programs and deserve having our major focus devoted to them *at the expense of moderately gifted students*. Even with such support, she argues, extraordinary talent will not necessarily lead to extraordinary adult giftedness, that is, to the ability to revolutionize a field as did Freud or Einstein. Winner is unimpressed by high-ability adults not characterized by such capital-C Creativity. (She does not seem to worry about the chaotic sort of world we would live in if all prodigies became so revolutionary as adults.)

And for children with lesser gifts? Essentially, let them fend for themselves. Winner maintains that, as school reforms enhance the academic expectations for all children, academically gifted children will no longer be bored in school. Even if they remain under-challenged, mild degrees of acceleration will take care of the problem.

From this reviewer's point of view, there are several problems with Winner's position. It may be all very well to write off children's moderate giftedness in chess playing or the visual arts, if, as David Feldman put it, "nature's gambit is to sacrifice an enormous amount of potential talent for the occasional sublime match of child to field that yields the prodigy" (1986, p. 11). But Feldman was writing primarily about prodigious development in children with specialized talents. In contrast with specialists, he said, generalists are more adaptable and able to express their abilities under varying circumstances. Their talents are not expendable. None of us believes that most gifted children achieve at the top level of which they are capable. If, through school reform, their classmates are to be brought up to gifted children's current levels of achievement, presumably this will take even more attention from teachers. How, then, will gifted children—treading water now—make further progress? How much talent will be lost to society if moderately gifted children are not challenged, if they never develop an appetite for hard work, if they drift along doing well enough but never their best? Whence will come the ranks of our first-rate professionals, academics, and world leaders, and wouldn't we prefer smart ones with discipline of mind? Indeed, whence will come the "moderately" gifted singers, dancers, and musicians whose talents enrich our lives? I, for one, am not ready to throw all these people away.

Winner makes the point quite rightly that many programs for gifted children in our schools don't do a good enough job. And that many children who need them are not even being served by what we have. Some are not recognized; some, because of unevenness in their abilities or because their abilities are non-academic in nature, wouldn't fit readily into the programs we have; many districts offer no programs of any substance. The research she quotes shows clearly, however, that there is the potential to make a difference in these children's lives through such efforts if we do it right. There's nothing wrong with grade- or subject-acceleration as one major tool to meet children's needs, but I believe Winner to be misinformed if she believes that it should be our only tool.

Furthermore, Winner does not actually tell us what she would like us to do for exceptionally talented children. How shall profoundly academically talented children be served and who will be their peers? And for those children whose talents fall outside school-focused domains, how shall we organize resources and who shall pay? What of the child who lives a distance from the megalopolises such as Boston, where there may be more than one child within a reasonable age range with a given sort of extraordinary gift? What shall we do for the special child in Great Falls, Montana, or Tupelo, Mississippi? Clearly, Winner has in mind more than she tells us.

Finally, Winner has tried to cover both the fields of giftedness she knows and those she doesn't. Some examples: she has limited knowledge of

intelligence testing and is unaware of revisions in major intelligence tests (pp. 23 and 45); she describes implausible subtest averages for high scorers (p. 45); she calls a national organization by the wrong name (p. 30); she confuses the Study of Mathematically Precocious Youth and the Johns Hopkins Center for Talented Youth (p. 43) and fails to acknowledge the several other regional talent searches. These errors are distractions. Someone should give her a hand next time.

Read this book, certainly, but read it warily!

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Ellen Winner replies:

I am glad to have a chance to respond to Nancy Robinson's review of my book. I feel that it is important to respond for she has misunderstood my position about education for the gifted. She has noted only the second half of a two-part argument.

Robinson begins by stating that my major point, or "punchline" is that we should elevate academic standards for all and use gifted resources only for the profoundly gifted. This is indeed my view, and I stand by it. I believe that American academic standards are woefully mediocre. I believe that most children identified as gifted in our schools, those of moderately gifted IQs (around 130) would not be unchallenged if they attended schools in France, Hungary, or Taiwan, countries known to have academic standards far more rigorous than ours. In no way do I advocate letting the moderately gifted "fend for themselves." In no way to I advocate programs in which "moderately gifted children are not challenged . . . never develop an appetite for hard work . . . drift along doing well enough but never do their best." I make it clear that my argument is a two-fold one: (a) sharply elevate standards for all children; (b) then use our gifted education resources for the profoundly gifted. Had I only argued for (a), then Robinson would be correct in her concern that I was throwing the moderately gifted to the wind. But indeed this was only half of my argument.

I do not know where in my book Robinson senses "disdain" for children with moderate gifts. And it is simply not the case that I "decline" to state my position on education until p. 273. The reader can find this position stated clearly on p. 10.

Robinson states that I do not prescribe how the profoundly gifted should be educated. She is right that I do/not devote much space to this difficult problem. But at the end of Chapter 9, I clearly stake out a position in favor of advanced classes that are domain specific and in favor of ability grouping so that profoundly gifted children can work with their age peers rather than be radically accelerated. I also praise the intensive summer programs run by the Center for Talented Youth, as well as special schools that have been set up for the gifted, both private schools and the newly developing public high schools for the gifted, where students have long stretches of class time in which to immerse themselves in learning, and in which students engage in independent research (see p. 269).

Of course I could have gone into far greater detail about the specifics of how the profoundly gifted should be educated. In fact, the entire book could have been devoted to this question This may have been the book that Robinson wanted to read, but it is not my book. Perhaps this is the book that Robinson should write. The purpose of my book was not to work out an educational program for the profoundly gifted. My purpose was to question nine different myths about children gifted in the domains of math, verbal ability, art, and music (none of which, by the way, do I consider "broader" than any other), and to correct these myths by taking a hard look at the best available scientific research.

In conclusion, I reiterate my position that if we elevated academic standards, then the moderately gifted would no longer be unchallenged and would not need special programs. Just where the cut-off would be between those no longer under-challenged and those still in need of more (despite a truly challenging curriculum) cannot be known in advance. The point is simply that many of our moderately gifted would no longer be bored if standards were really raised. I also stand by my position that reforming education for the gifted in the manner that I have called for must go hand in hand with the general educational reform that I advocate. Our standards need to rise from minimal to demanding. The profoundly gifted will continue to need special education because the profoundly gifted will continue to be a very atypical, special group. Such special education can take many forms but I do believe that the sketch I presented - domain specific ability grouping with like-minded profoundly gifted children - is the way to go. This is a far cry from the several hour a week pull-out enrichment programs for the gifted that meet the needs of few, if any, of the children they are intended to serve.

Psychological Aspects of Giftedness

Ellen Winner
Gifted Children: Myths and Realities
New York: Basic Books, 1996. 449 pp.
ISBN 0-465-01760-6. $28.00; $39.50, Canada

Review by Camilla Persson Benbow

Ellen Winner, professor of psychology at Boston College (Chestnut Hill, Massachusetts) and senior research associate at Harvard Project Zero, is author of Invented Worlds: The Psychology of the Arts and The Point of Words: Children's Understanding of Metaphor and Irony. *Winner is past president of Division 10 (Psychology and the Arts) of the American Psychological Association. • Camilla Persson Benbow is distinguished professor of psychology, interim dean of education, and co-director of the Study of Mathematically Precocious Youth and of the Office of Precollegiate Programs for Talented and Gifted at Iowa State University (Ames). Benbow is coeditor, with J. Stanley, of* Academic Precocity *and, with D. Lubinski, of* Intellectual Talent: Psychometric and Social Issues.

Individuals who stand out from the norm on the basis of their exceptional abilities or talents have captured the attention of people down through the ages. Early on in civilization the gifts of these individuals, such as the medicine men and the great ancient philosophers, were seen as divinely inspired. Muses whispered in their ears or they had their own special demon. (In those days, demons did not carry a negative connotation.) That fascination with individuals who stand out on the basis of their great or highly unusual abilities has not abated. It is with us today as we marvel over the feats of individuals in the Guinness Book of World Records (perhaps in consternation) or the feats of gifted children and prodigies. We are led to ask: Who are these individuals? What are their characteristics? How do such special talents emerge and develop? Are gifted children different in their area of exceptional skill from other children in a qualitative or in a quantitative manner? What proportion of gifted children grow up to become highly achieving adults? How do we best nurture their gifts? For anyone whose curiosity is stimulated by such questions or thoughts, regardless of their theoretical orientation, Ellen Winners book, *Gifted Children: Myths and Realities*, should be added to their reading list.

Reprinted from *Contemporary Psychology*, 1998, Vol. 43, No. 1.

For anyone in the field of gifted education or the psychological aspects of giftedness in general, it should be seen as must reading. Many insights into precocious intellectual development will be gained by doing so.

Winner begins by exposing nine common myths about gifted children and. thereby, introduces her book. She brings the book to a close by sorting myth from reality. In between we are exposed to the knowledge that allows her to perform that sorting. We learn about the different forms of giftedness, going well beyond academic talents to cover artistic and musical talents as well. Few books on giftedness take such a broad view. We learn that giftedness in its various forms has its unique twists. Moreover, she exposes the myth of the globally gifted child. Indeed, some gifted children are even learning disabled. Most important, however, she questions the view that gifted children are exceptional across the board or have "multipotential." This idea of multipotentiality (i.e., gifted children being good at and liking many educational or career paths and hence are drowning in a sea of possibilities) has been an issue that has dominated gifted education for many years even though there is no empirical basis for it (Achter, Lubinski, & Benbow, 1996). Needless to say, this concept has not been helpful, hurting both gifted education and gifted children.

After clearly delineating various forms of giftedness, Winner then goes on to explicate what we have learned about giftedness in its various forms from work in cognitive psychology (e.g., differences in memory processes) and then moves on to discuss the biological bases of giftedness. In the biological arena, Winner is quite forthcoming, not tempering her conclusions to appeal to popular political or ideological sentiments. A full chapter is devoted to summarizing work that points to neurological and genetic differences between gifted and ordinary individuals and among different kinds of gifted populations. Winner brings her chapter to a conclusion by asking: If we can accept that biological mental retardation exists, which all of us do accept, then why do we have such difficulty accepting the existence of biological acceleration of mental development? She goes on, with my applause, to question the wisdom of recent work in which psychologists have suggested that any amount of deliberate practice by ordinary people could bring them up to the level reached so quickly by a child prodigy or a savant. The chapter ends with "And so, with respect to the origins of giftedness, the common sense view turns out to be less of a myth than the psychologists' view" (p. 180). I can only agree.

Such a conclusion does not imply, of course, that heredity is destiny. Any expressed phenotypic trait is the result of nature and nurture working together. She aptly documents this by revealing the important role of families and schools in the translation of childhood potential into adult achievement (cf., Scarr, 1996). In this regard, let me just highlight two quotes that illustrate not only this concept but what an astute observer Winner is.

> *While some parents are destructive by over-pushing, I have also seen another kind of subtler destructiveness—parents who are never satisfied with their gifted children's schooling, even when they are getting the best, most challenging kind of gifted education our country offers. I have seen such parents repeatedly pull their children out of one school after another. ...Such parents strike me as invested in having nothing work for their children. This way they can see their children as brilliant victims, and themselves as saviors.* (p. 205)

I have seen that too.

> *When pondering how families affect giftedness, we often assume that the relationship is one-way and that the family determines the outcome of the gifted child. But the relationship is two-way, for a gifted child dramatically affects the organization of the family. The presence of a gifted child serves to focus a family's attention and mobilize its resources, just as does the presence of a retarded or handicapped child.* (p. 205)

Of course, the gifted child is also active in shaping and manipulating their environment to better meet their needs.

In her chapter on schooling, Winner provides a pointed critique of how America educates its gifted children, covering similar points that I have made (Benbow & Stanley, 1996). We are indeed short-changing gifted children in our schools today. Winner believes that

> *we are wasting what few resources we have for gifted education on the moderately academically gifted. We would do far better if we elevated the level of instruction for all students and concentrated our gifted resources only on the extreme children.* (pp. 273-274)

Not all would agree, but her idea certainly has merit.

Winner then moves on to discuss the emotional life of the gifted child, which is summed up so well by "So Different From Others"—the heading for that chapter. Highly gifted children do experience emotional problems in contrast to their more moderately gifted peers, which Terman and others have shown to be overall models of social adjustment. Yet

> *the social and emotional problems faced by the gifted are caused not by their being gifted but by the consequences of their being so different from others. These children see things differently, and they have different interests and values. They*

> *face a sharp conflict between intimacy and excellence.... Choosing intimacy, they risk losing their motivation to excel and may disengage from their domain of talent. Choosing excellence, they must face loneliness and isolation. It is only those who are willing and able to choose excellence who have a chance at successfully traversing the route from gifted child to eminent adult.* (p. 233)

Unfortunately, that is a story that so rings true.

This naturally leads to what happens to gifted children. Not all gifted children grow up and become highly achieving adults. That is, the degree to which they stood out as children is too often not matched by their accomplishments in adulthood. Winner concludes that

> *it would be satisfying to be able to conclude this book with a list of factors that would allow us to predict those gifted children who will drop out, those who will become experts, and those who will alter their domains.... Early high ability is an imperfect predictor of ultimate achievement in adulthood because so many factors play a role—family, educational opportunity, personality, and luck.* (p. 303)

Longitudinal findings up to now are in accord with Winner's depiction of the talent development process:

> *Those gifted children most likely to develop their talent to the level of an expert will be those who have high drive and the ability to focus and derive flow from their work; those who grow up in families that combine stimulation with support; and those who are fortunate to have inspiring teachers, mentors, and role models. Those gifted children most likely to leave their creative mark on a domain in adulthood will also have high drive, focus and flow, and inspiring mentors and models. But in two other areas they should be different. They should be willing to be nonconforming, take risks, and shake up the established tradition. And they should be more likely than those who become experts to have grown up in stressful family conditions.... Many are also likely to develop some form of affective disorder. In addition, they must be born when the times are right: their domains must be ready for the kinds of changes they envision, and there must not be too many others likely to beat then in revolutionizing the domain first. Those gifted children predicted to burn out are those whose parents push them to extremes and are over-involved in their development.* (pp. 304-305)

There is certainly truth in those words.

It is not often that one has the opportunity to read a book with which one can emphatically agree so often. My copy of this book has indeed become marked throughout by me with many an emphatic "Yes!" Yet, unless it is one's own book, there are always some points of disagreement. For Winner and me, we seem to part company when it comes to IQ. We both agree that giftedness is much more than a high IQ score, that it is much more fruitful to focus on specific talents than on general intelligence, and that the level of adult achievement attained depends on many other factors beyond IQ. I, however, have more faith in the value and usefulness of IQ. There are simply too many studies that have documented the value of IQ scores in predicting educational and vocational success to dismiss its importance (Gottfredson, 1997b; Linn, 1982; Lubinski & Dawis, 1992). If you could have only one predictor of vocational success, I and many others would put our money on IQ (Gottfredson, 1997a; Snyderman & Rothman, 1987). Moreover, the idea that, after a certain level of IQ, IQ loses its predictive power has not held up to empirical scrutiny (Benbow, 1992; McNemar, 1964). More, in this case, is indeed better. But perhaps Winner and I are not so far apart in our thinking after all. She concludes at the end of her book that "there is a vast difference between a child with an IQ of 180 and a child with an IQ of 130, and they should not be treated as belonging to the same group with the same kinds of educational needs" (p. 311). I can only agree.

In conclusion, this is a book that is full of solid empiricism coupled with interpretative wisdom. My own experiences working with thousands of academically talented youth have led me to the very same observations that Winner has so eloquently put into words. This is indeed a book that I wish I had written.

Winner's *Gifted Children* will be of interest to the casual reader for whom this book could be an introduction to the psychology of giftedness, or those with scholarly interest in the field, who would appreciate the deft integration of various concepts and issues in the field. Reading this book should illuminate why so many of us find this field so fascinating and ripe for making important discoveries. Yet the usefulness of this book is broader than this. In my view, *Gifted Children* should become the first introduction to the field of giftedness for either advanced undergraduate or beginning graduate students. There are a great many books on the market dealing, at a general or introductory level, with the topic of gifted children. The vast majority of these books are targeted toward educators and involve issues such as identification and curricular modifications—the nuts and bolts of gifted education—or providing the armotorium of skills that a gifted coordinator or teacher should have at their disposal. As important as such issues and techniques are in gifted education, should they come first? Should not the practice build on a foundation of scientific knowledge on precocious intellectual development? Perhaps if practice was grounded in

such knowledge, we would not have the debate in our schools as to whether we should adjust our practices to meet the needs of gifted children. Educators would understand why such adjustments, which respond to individual differences, are a necessity and only equitable (Benbow & Stanley, 1996). Perhaps with such a grounding educators would not be as easily smitten by the latest fad on the educational landscape. So much of what we do in education, perhaps especially in gifted education, is not based on principles derived from a cumulative science but on the latest fad. Yet, as far as I am aware, there is no book on the market in which the expressed purpose is to provide a psychological grounding for giftedness. Individuals like me who teach courses on the psychological basis and characteristics of giftedness have been left with no textbook to adopt. Rather, such a course, if it is to be found, had to be approached from an instructor's own collection of readings. Winner's book fills that void and does it beautifully. I am grateful for her fine work and hope that her contribution will lead to enhanced training in and understanding of the field of giftedness. Winner's book is true to her name— it's a winner!

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Programs for the Gifted Few or Talent Development for the Many?

By John F. Feldhusen

Students at all ages and grade levels are entitled to challenging and appropriate instruction if they are to develop their talents fully, Mr. Feldhusen points out.

The Gifted education movement grew out of the pioneering research of Lewis Terman and Lita Hollingworth and took flight after the launch of Sputnik in 1957. The momentum continued to build with the subsequent publication of the Marland Report in 1972, which documented neglect of the gifted in American schools.[1] With small-scale financial support from the federal government and larger support from most state governments, educational programs were developed in nearly all the states. Elementary programs favored the pull-out enrichment model, while secondary programs favored the use of special classes.[2]

Supporters of the development of programs included a number of organizations: the National Association for Gifted Children, the Talented and Gifted (TAG) Division of the Council for Exceptional Children, and state associations for the gifted, as well as a host of individuals, among them James Gallagher, E. Paul Torrance, A. Harry Passow, Abraham Tannenbaum, Paul Witty, Barbara Clark, Joseph Renzulli, Irving Sato, Dorothy Sisk, Julian Stanley, and Joyce VanTassel-Baska, who led the field with their research and expertise in developing procedures for identifying and educating gifted children. The magnitude of growth in gifted education is documented in *National Excellence: A Case for Developing America's Talent*, a 1993 report from the U.S. Department of Education.[3]

Strong attacks on the emerging field came in 1985 with the publication of two books: *Keeping Track: How Schools Structure Inequality*, by Jeannie Oakes, which criticized the grouping practices of American schools; and *Educating the Ablest: Programs and Promising Practices*, by June Cox, Neil Daniels, and Bruce Boston, which rendered a negative evaluation of the vapid pullout enrichment programs that the authors characterized as having seen their day.[4] In 1988 Paul Chapman took both the intelligence and the achievement testing movements to task for having come to dominate school

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John F. Feldhusen is the Robert B. Kane Distinguished Professor of Education, Purdue University, West Lafayette, Ind.

Reprinted from *Phi Delta Kappan*, June 1998.

practice to the advantage of the Nordic population and the disadvantage of black, Hispanic, and low-income youths.[5]

Paul Kingston and Lionel Lewis in *The High-Status Track*, an edited volume published in 1990, presented the views of 13 scholars who indicted the secondary- and college-level institutions in the U.S. that have risen to elite status with clearly excellent academic programs but, as the authors see it, restrictive admissions policies that systematically block many minority and low-income youths from enrolling. Graduates of these elite schools move into career tracks that practically ensure the attainment of high-level professional positions, while young people who do not attend such institutions rarely attain equal professional status. "These schools," they write, "are socially elite, largely enrolling offspring of the upper-middle and upper classes. Moreover, their graduates are prepared for privilege and enjoy disproportionate access to high-status occupations."[6]

In *The Manufactured Crisis*, their 1995 defense of American schools, David Berliner and Bruce Biddle also attacked gifted programs as elitist and biased. They wrote:

> *Despite their seductive appeal, and despite their frequent promotion by privileged Americans, enrichment programs are not the way to improve American education. There is no evidence that they accomplish the goals claimed for them, and they tend to weaken some of the most impressive traditional strengths of America's schools.*[7]

Berliner and Biddle are wrong in asserting that no evidence exists that gifted programs accomplish their goals. Indeed, there is much evidence that they do. However, by focusing programs on the elite few, programs for the gifted probably do little to improve schools overall.

It is clear that programs for the gifted are under severe attack. However, in *Dumbing Down Our Kids*, Charles Sykes says that it is the children who suffer when gifted programs come under attack and disappear.[8] And Ellen Winner has argued in her recent book, *Gifted Children: Myths and Realities*, that no society can afford to ignore its most gifted members and that all must give serious thought to how best to nurture and educate talent.[9] Thus the goal for all of us must be to find ways to develop the talents and special aptitudes of as many young people as possible, while recognizing the special needs of highly talented youths for learning experiences at a level and pace appropriate to their abilities.

Categorizing and Labeling

It is immoral to identify a large majority of the nation's young people as "ungifted," which implies that they are devoid of talent, and it is equally

immoral to provide no or inappropriate educational services to precocious youths who are ready for high-level, fast-paced, in-depth instruction. We do the former when we carry out an elaborate process with tests and rating scales that results in the labeling of approximately 5% of the school population as "gifted," thereby indirectly labeling the rest as "ungifted." We do the latter when we insist that precocious youths be placed in heterogeneous or inclusive classrooms that pay no attention to their educational needs, a point argued in a 1993 research report.[10] That report, based on classroom observations throughout the U.S. and on an extensive survey of classroom practices, concluded that most gifted and talented children receive little or no instruction appropriate to their levels of readiness, even though most states and the federal government have set up offices and provided funding to local school districts for special programs and services for academically gifted youth.

The original Marland Report advocated services for precocious youths in six areas: general giftedness, leadership, creativity, psychomotor abilities, academic talent, and artistic talent. But schools have focused almost entirely on general giftedness. Identification schemes promulgated by Alexina Baldwin and Jay Wooster in 1977 and by others later showed school personnel how to crunch numbers from I.Q. tests, achievement tests, and rating scales to derive a single index of overall ability, rank the index numbers, and draw a cutoff above which a child is declared "gifted."[11] A national study in 1982 showed how arbitrary and potentially fraught with error and psychometric ignorance this type of generic identification process can be.[12]

After having been identified through an elaborate process of seeking the "truly gifted," a child is admitted to one of the ubiquitous pullout enrichment programs. Tuesday and Friday mornings at 10, Jane, Tom, Mary, and Bob leave their classroom and go to the "GT room" for instruction in higher-level thinking skills, for work on independent projects, for field trips, and so on. Research published in 1991 showed that worthwhile learning did occur in these settings, but it was never demonstrated that children not identified as "gifted" would not also have profited from the activities.[13] Moreover, critics have found a lot wrong with the approach, declaring that the pullout/enrichment model should be replaced with increasingly more specialized and challenging academic services geared to children's levels of precocity.[14] Subsequent research by James Kulik suggested that special groupings of high-ability youths in particular academic areas do lead to higher academic achievement.[15]

But it is now 1998. While the pullout/enrichment model is still in widespread use, countervailing forces—the inclusion movement, the promotion of detracking, heterogeneous grouping by age and grade level, and the serving of precocious youngsters in regular classrooms—grew in strength in the late 1980s and 1990s, inspired by Jeannie Oakes' work and by Robert Slavin's work with cooperative learning.[16] Thus many precocious and

highly talented young people get no specialized instruction whatsoever, and the goals and practices of existing programs are often ineffectual for them.

The residual effect of all these years of failing to meet the special needs of precocious youth is, paradoxically, a continuing pressure in the public schools to degroup, detrack, and group heterogeneously, often disregarding any signs that some children are so advanced that regular classroom instruction is of little value to them. These children are expected to cool it, teach others who are less able, and socialize. In rapidly increasing numbers, such children are fleeing to private schools if their families can afford them, to the state-supported residential schools for precocious youths now operating in 11 states, to early college admission, to dual enrollment in college and public school, to summer and Saturday programs at colleges and universities, to home schooling, to magnet schools, and to charter schools. It should also be noted that, in defiance of the faddish inclusion movement, some public school districts continue to offer special schools or special full-time classes for gifted and talented youths. These schools and classes can be extremely beneficial for highly talented youths, especially those who are academically talented.

Talent Orientation

Traditionally, programs for the gifted have focused only on those who are deemed "generally gifted" or are "academically gifted." Instead, I believe children exhibit a wide diversity of talents in the vocational/ technical area, in the academic disciplines, in the arts, and in the personal and social domains. In identifying the talents of our young people, we should make use of tests, rating scales, auditions, and classroom observations by teachers. Moreover, while we should be concerned with nurturing the talents of all young people at all levels of ability, we need to pay special attention to those who are very highly talented and often neglected in school. All young people need challenging learning experiences, and we can provide them only when we know the nature and level of their talents. Elsewhere, I have spelled out procedures that schools can use in talent identification and development in education (TIDE),[17] and a number of schools are already accomplishing these tasks well.

Once students have been identified, schools can provide learning experiences that encompass a wide variety of areas. My colleagues and I have conducted research that suggests that precocious youths typically have strong talents in three or four areas.[18] We don't know much yet about less-able youngsters, but two projects carried out by Kenneth Seeley in 1984 and Kenneth McCluskey and others in 1995 give us clues that talent strengths can be identified and used to draw underachievers, school dropouts, and delinquents back into the mainstream of education.[19]

My colleagues and I have developed a framework for meeting the needs of young people with diverse talents throughout the K-12 grade spectrum. All young people need recognition as legitimate human beings, and this we visualize as the base of a pyramid, a foundation on which all else is built. A wide variety of learning experiences can then be seen as rays extending vertically upward from this base, with the length of each varying according to an individual student's talents and interests. Thus the longest rays would be nearest the center and represent relatively stronger talents. From this variety of learning experiences students can derive increasing understanding of their own talents and capabilities, and from that understanding they can build a personal commitment to develop their talents. Using this model, school counselors are assigned the task of helping all students gain acceptance in some appropriate groups, while the coordinator of gifted programs and services (with the new title of "talent development specialist") would have the task of identifying, with the help of teachers, students' specific strengths and aptitudes and organizing as many activities, classes, and services as possible to serve the needs of youths with special talents.

The TIDE Alternative

Talents are capabilities in specific domains of aptitude. Some young people are very highly talented academically, artistically, in technical areas, or in interpersonal activities, while others have moderate or low levels of these special talents. Academic talents (e.g., mathematics, social studies, writing, science, literature) show themselves in classroom learning and on standardized achievement tests. Artistic talents are revealed in art classes, competitions, and performances. The technical areas of talent include computers, industrial technology, home arts, agriculture, nursing, and so on, and high levels of performance in these areas, both inside and outside of school, are evidence of such talent strengths. Finally, the interpersonal talents include special ability in leadership, teaching, counseling, care giving, and so on. Indeed, we agree heartily with Howard Gardner, who has said, "It is clear that many talents, if not intelligences, are overlooked nowadays; individuals with these talents are the chief casualties of the single-minded, single-funneled approach to the mind."[20]

We were thrilled theoretically and practically when we first saw Francoys Gagné's model of talent development, suggesting that the direction of the development of human abilities is from broad, general aptitudes toward increasingly specific talents.[21] Gagné has pursued a career-oriented, programmatic line of research, establishing the nature and development of human talents.

Our own research at Purdue University and with many public schools, hundreds of teachers, and thousands of young people convinces us that

there is an urgent need in all schools to help students at all levels of achievement and ability to identify their special aptitudes and talents. All schools also need to provide instruction, services, activities, and guidance to help students optimize the development of their talents.[22] Many talents can be identified through testing, but observation and ratings of students in real, challenging learning activities are the ideal ways to discover and nurture students' domain-specific talents.

We must broaden our conception of human talents beyond the narrow academic focus that now prevails in schools. The assessment of talents is both an "inter-student" process of finding those with high levels of talent and an "intra-student" process of helping each student find his or her own talent strengths. We must recognize that talent identification is a long-term process that depends on a wide variety of tests and challenging learning experiences in which teachers and others provide feedback that helps students come to understand the nature of their own talents and to commit themselves to their long-range development.

It is undesirable to identify some students as "gifted" and the rest as "ungifted." All students at all ages have relative talent strengths, and schools should help students identify and understand their own special abilities. Those whose talents are at levels exceptionally higher than those of their peers should have access to instructional resources and activities that are commensurate with their talents. The one-size-fits-all mentality that is at least partly an outgrowth of the inclusion movement reflects a mistaken view of human development. Highly talented young people suffer boredom and negative peer pressure in heterogeneous classrooms.[23] Students at all ages and grade levels are entitled to challenging and appropriate instruction if they are to develop their talents fully.

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[7] David C. Berliner and Bruce J. Biddle, *The Manufactured Crisis* (NewYork: Addison-Wesley, 1995), p. 211.

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[9] Ellen Winner, *Gifted Children: Myths and Realities* (New York: Basic Books, 1996).

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[17] John F. Feldhusen, *Talent Identification and Development in Education*, 2nd ed. (Sarasota, Fla.: Center for Creative Learning, 1995).

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[21] Francoys Gagné, "From Giftedness to Talent: A Developmental Model and Its Impact on the Language of the Field," *Roeper Review*, vol. 18, 1995, pp. 103-11.

[22] John F. Feldhusen, "How to Identify and Develop Special Talents," *Educational Leadership*, February 1996, pp. 66-69.

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Barriers to Research in Gifted Education

Dewey G. Cornell[1]
University of Virginia

Abstract

Recent reviews of the field of gifted education indicate that most recommended practices have only modest research support. New research often is poorly integrated with previous research, resulting in a noncumulative knowledge base that has feeble influence on either theory or practice. How can research on the education and development of high ability children be improved? This presentation will examine psychological and methodological barriers to more effective research on high ability children. Positive and negative examples from the author's recent research will illustrate some of the pitfalls researchers face in the field. In order to overcome current barriers to research, the author proposes: voluntary certification of gifted programs, a national research agenda, and improved research standards in gifted education.

Barriers to Research in Gifted Education

This is a time of great opportunity for gifted education. Our national goal of improving American education, especially the specific objective of making American students first in the world in mathematics and science by the year 2000 (National Goals for Education, 1990), provides an opportunity for renewed national attention to the needs of high ability students. American education will not attain this objective if our most capable students are not educated to their full potential. Similarly, the United States will not compete successfully in fields ranging from science and technology to business and economics without an educational system that encourages and challenges children with exceptional abilities.

The more positive political and social climate for gifted education is accompanied by new funding opportunities for research and program

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[1] The author appreciates the astute comments and helpful suggestions of Ann Robinson and Bruce Shore in preparing this presentation.

Reprinted from Nicholas Colangelo, Susan G. Assouline, and DeAnn L. Ambroson, Eds., *Talent Development: Proceedings from the Henry B. and Jocelyn Wallace National Research Symposium on Talent Development*, 1994 (pp. 173-194). Reproduced by permission of Gifted Psychology Press, Inc., P.O. Box 5057, Scottsdale, AZ 85261.

development, including the Javits grants funded through the Department of Education, the Esther Katz Rosen Fund administered by the American Psychological Foundation, and of course the establishment of programs like the Connie Belin National Center for Gifted Education which sponsored the Wallace Symposium.

The purpose of my presentation is to highlight some of the problems and difficulties which may prevent the field of gifted education from taking full advantage of these unprecedented opportunities. My contention is that there are substantial barriers to research in our field which we must recognize and overcome. The focus of my presentation is on constructive criticism and the identification of some specific strategies for improving research in gifted education.

Compromising Our Standards

Recently a former student called me to ask my advice about an exciting new project he was asked to join. The project involved implementing a new instructional approach in a large school district. My former student, now a colleague at another university, was invited to study effects of the instructional approach on student achievement. The project design called for a baseline assessment of student achievement with a follow-up assessment a year later. Unfortunately, the new instructional program was ready to begin now and the baseline assessment could not be implemented for several months. My colleague described his frustration in trying to convince the project director that a baseline measure must be obtained prior to the intervention. The director was adamant that the school system wanted the instructional program implemented immediately and my colleague should just "do the best he can." The irony of this situation is that the more effective was the new instructional program in producing an immediate improvement in student achievement, the less effective would be the research design, since major change would have occurred prior to the baseline assessment.

Our conversation shifted from a discussion of research methods and achievement measures for high ability children to the question of how the director managed to finagle such a large government grant for this new program and also how much time and effort my colleague should invest in a doomed research project. I realized that our discussion was not about research methods, but research politics. This is an old subject in the field of program evaluation (House, 1973). I ended the conversation wondering if the time my student spent on coursework in research methods and statistics should have been better spent in training on school politics and negotiation skills.

The problem my former student reported—trying to examine program effects after a program has already started—is not an isolated case. To illustrate the substantial difficulties researchers face carrying out school-based research, I want to describe briefly an ill-fated project I worked on for several years. This was a large-scale, longitudinal project designed to examine changes in achievement, self-concept, and attitudes toward learning among over 1,000 elementary school students. This project was not designed as a program evaluation study, but as a study of children's development in several areas related to learning. As originally conceived, the study was designed to assess children when they first entered a gifted program, then follow them up over several years. This study was designed to include students in several different types of gifted programs, with a control group of children who met criteria for giftedness, but who were enrolled in schools without gifted programs at their grade level.

Unfortunately, the project experienced many difficulties which compromised its design and prevented its full implementation. Many school administrators were unwilling to undertake a research project which would report on the academic progress of their gifted students, even when assured that individual schools or school systems would not be singled out or subjected to individual program evaluation.

It proved to be even more difficult to obtain control subjects. Although we were able to identify school systems which did not have gifted programs for students at the target grade levels, these school systems were exceedingly unwilling to draw attention to this fact by agreeing to participate in the study.

In addition, there were numerous practical and logistical problems in implementing the study. For example, schools differed in procedures for identifying and recruiting potential subjects. Schools differed in the level of priority given to making testing arrangements and encouraging teacher cooperation. I suspect these are familiar problems to many researchers. As a result of these kinds of problems, the project was unable to arrange for the schools to begin the first round of data collection until well into the academic year, in some districts as late as December and in one case even January. Testing procedures and study instruments had to be modified or dropped to fit differing school requirements. These and other problems adversely affected the project. Judged from the standpoint of its original goals, this project was a failure. There may be useful secondary studies and answers to ancillary research questions generated from the huge data base, but I concluded that it would not be possible to answer the original project questions.

I am sure that many of you in the audience could contribute your own examples of futile research efforts. Of course, experts in program evaluation might regard these problems as predictable if not inevitable (Madaus, Scriven, & Stufflebeam, 1983). From their perspective, my expectations

may seem naively idealistic. Unfortunately, the distinction between educational research and program evaluation has become blurred. The program evaluator can be conceived as anyone ranging from a systems analyst to an art critic, with accompanying differences in standards and procedures (House, 1978). The pervasive concern with program evaluation in education, and the numerous forms of program evaluation, threaten to overshadow and obscure even the most elementary requirements of standard research design, like baseline assessment prior to an intervention.

Whenever we move from the laboratory to the classroom, research in education inevitably involves compromise and accommodation. I do not question the need to adapt our research methods to make them less intrusive and disruptive to the educational process, or to adjust them to the genuine practical considerations and individual characteristics of the local school environment. I do question how much we should compromise research standards in order to accommodate local interests. When does compromise render our research effort pointless or futile?

Experienced researchers may sigh in resignation and counsel junior colleagues to accept as a fact of life that research in the real world inevitably involves political compromise. I have heard such views expressed by several senior researchers in gifted education.

I would like to challenge this passive view. As a researcher in gifted education, I have been fortunate to conduct research with the cooperation of a variety of public and private schools, a parent advocacy group, an early college entrance program, and a summer camp. Because of my research interests in fields other than gifted education, I also have had opportunity to conduct research in several psychiatric hospitals and clinics, as well as juvenile and correctional settings. For three years I did clinical work and conducted research in a state institution for the criminally insane. All of these settings have their own institutional procedures and bureaucratic requirements. As you might imagine, some of these settings presented quite formidable legal and practical difficulties, not to mention the practical and ethical problems of obtaining informed consent from not-too-willing subjects.

Yet the barriers to research I encountered within the walls of a maximum security institution for the criminally insane were negligible in comparison to the barriers encountered within the walls of some public school systems. The two basic reactions one encounters in the schools are skepticism and trepidation. There is general skepticism among educators and administrators that educational research is worth the time and trouble. Too many educators are skeptical of the practical value of research, and see it as an imposition rather than a prerequisite to progress.

There is also tremendous trepidation that the results might cast someone or some program in a negative light. Program administrators often are more concerned with avoiding criticism and maintaining the

status quo than learning about the consequences of their program. Better not to know whether the gifted program or instructional approach does what it claims to do.

Of course I do not want to paint every school with the same brush. We all appreciate the educators who have opened their doors and allowed us inside the building to study and learn what we can. And I do not want to imply that all of the responsibility lies with the schools. Certainly we have not always done the best job with the research we have been permitted to undertake, which is a matter I want to discuss in some detail.

Barriers Between Research and Practice

Skepticism of education research is widespread. Carl Kaestle, an historian of American education at the University of Wisconsin, recently entitled an article in *Educational Researcher*, "The awful reputation of education research" (Kaestle, 1993). In this article he describes the widespread perception among government policy-makers and educators alike that: a) education research is often irrelevant to educational practice, and has little direct relation to what teachers teach or students learn; and b) the field is so heavily politicized that many education projects are largely a means of promoting political values and ideology rather than objective efforts to uncover knowledge. These views might well describe the status of gifted education research, too.

How is gifted education viewed by others? A scathing article in *The Executive Educator* (Harrington-Lueker, 1991, p. 19) stated bluntly, "too much of what passes for gifted and talented education...is trivial, faddish, and unlikely to meet the needs of gifted youngsters." The article quoted William Durden, Director of the Center for Talented Youth at Johns Hopkins University, "Gifted and talented education is the biggest consumer rip-off going" (Harrington-Lueker, p. 19). Even a staunch advocate of gifted education, Joe Renzulli, acknowledged, "This business is very attractive to crackpots" (Harrington-Lueker, p. 19). Anonymous sources were quoted as describing various aspects of gifted education as "bogus," "squishy," and "snake oil" (Harrington-Lueker, p. 20).

How much does research in gifted education influence practice? There is no direct means of obtaining an answer to this difficult question, but the available evidence suggests the answer is "Not very much." Consider the prominence of research efforts in the gifted education literature. Most of the published literature is not data-based research, but articles presenting theory and advice. Carter and Swanson (1990) reviewed 1,700 journal articles in gifted education and found that only 24% were data-based. In contrast, 62% of the articles in the field of learning disabilities were data-based. Even when Carter and Swanson identified the most prominent,

frequently cited articles in the field, only 29% were data-based; again this was far less than in the learning disabilities field, where 78% of the prominent articles were data-based.

In 1983 Bruce Shore of McGill University initiated a major project to examine the research support for existing practices in gifted education. This project asked two basic questions, "What are the existing recommended practices in the field and what research supports their use?" Dr. Shore's project involved over seven years of study and investigation, conducted in collaboration with Ann Robinson, Virgil Ward, and myself, and with the assistance of numerous graduate students and other colleagues along the way.

In this project (Shore, Cornell, Robinson, & Ward, 1991) we reviewed 100 major books in gifted education and identified 101 recommended practices. Not practices we recommended, but practices recommended by others in the field. The recommendations covered a wide range of topics; among them were identification practices, curriculum and instructional policies, advice to parents, social and emotional needs, and special populations such as minorities, underachievers, and learning disabled students. We reviewed each of the 101 recommended practices to examine its research base and identify specific research needs.

Unfortunately, our results indicated that research has played a relatively minor role in the recommended practices in gifted education. Only seven of 101 practices could be said to be strongly supported by existing research. There were 34 more practices with at least some research support, but most practices lacked adequate research support.

Fortunately, there were only a handful of practices directly contradicted by existing research, but there were many more practices with little or no supporting research.

Here are some examples of recommended practices (numbered according to Shore et al., 1991) which have great face validity and are widely accepted in the field.

9. Teachers should be specially selected and trained.
13. Identification should be made as early as possible.
29. Enrichment should be a program component.
46. Thinking skills should be taught.
72. Facilitate social development through ability-peer contact.
80. Early college entrants require special attention to socioemotional adjustment.
99. Especially develop positive self-concept in gifted underachievers.
101. Secondary mathematics and advanced science should be part of the curriculum for gifted girls.

You may be surprised to learn that only one of these practices could be classified as "strongly supported" by the research literature. One practice could be classified as generally applicable to all children, and the remaining practices can be described as having relatively little or no research support (Shore, et al., 1991).

Personally, I believe that all of these practices have merit, but personal opinion should not be the basis for judging any educational practice. I want to comment on the last three practices and present some recent research completed by my graduate students and myself at the University of Virginia.

Recommended Practice 80: Early College Entrants Require Special Attention to Socio-emotional Adjustment

This is an unusual recommendation because many advocates of early college entrance frequently dispute it. There are numerous studies reporting the academic benefits of early college entrance (Brody & Stanley, 1991). Such studies often make sweeping statements asserting the absence of negative effects on student social and emotional adjustment. This has become one of those "accepted truths" in the field which is repeated in many writings. To challenge this view is to risk vehement criticism. In a recent review of literature (Cornell, Callahan, Bassin, & Ramsay, 1991) my colleagues and I pointed out that the research evidence claiming an absence of social or emotional adjustment problems among early college entrants is methodologically weak. We pointed out several common problems in the existing literature:

First, studies often made relatively unsophisticated attempts to measure psychological adjustment, using brief rating scales or telephone interviews which simply asked students how they felt. Such studies also did not take into account the natural defensive tendency of individuals to deny or minimize adjustment problems. To their credit, some studies have used more sophisticated adjustment measures, but these studies have a second drawback: the use of a cross-sectional rather than longitudinal design. One study, widely cited by others as vindicating the effects of early college entrance, actually assessed students *before* early college entrance. The fad that students who are about to enter college early do not differ from a comparison group does not inform us about the effects of early college entrance.

Third, studies have employed samples which consist of academically successful students or program graduates, which biases the sample by excluding program drop-outs who might have adjustment problems. The importance of this problem became clear to me when I attempted to send a follow-up survey to students who had left an early college entrance

program. One set of parents wrote back to me that their daughter was so severely emotionally affected by her experience in the program that in order to protect her from further distress they wanted no further contact with the program or my follow-up research project. They described the problems she had in the program, a long period of psychotherapy after leaving the program, and then successful involvement in a different educational program. The parents insisted that I not reveal personal information about her. This points up a serious but to some extent unavoidable problem. Parents often will agree to case studies of highly successful accelerants, but quite understandably, parents are reluctant to permit case studies of accelerants who have negative experiences. Other than a few unusual or tragic cases which are publicized in the media, we have limited means of learning about the nature or extent of problems experienced by unsuccessful early college entrants.

Finally, most of the studies were conducted by partisan researchers, individuals with strong interests in obtaining support for their programs. Even if these researchers were able to be objective in their work, their adolescent subjects may well have been reluctant to confide personal problems or express criticisms of the program. I think it is important to have studies of early college entrance programs, as well as other gifted programs, conducted by researchers who are independent of those programs.

I do not make these criticisms of early college entrance research because I think early college entrance is a bad idea, or because I think it is harmful. It should not be controversial to say that early college entrance is a good idea for many students, and not a good idea for others. It should not be controversial to say that although early college entrance researchers voice nearly unanimous agreement that early college entrance is a good idea, many educators, many parents, perhaps the general public as a whole, remain unconvinced. If we are going to persuade anyone other than ourselves that early college entrance is safe and effective, we should have solid, convincing research which demonstrates that we can identify who is likely to do well in college and who should be counseled to wait.

The existing research literature does not demonstrate that we know how to identify the students who are emotionally as well as academically appropriate for early college entrance. We do not have an established means of identifying students who are academically but not emotionally appropriate for early college entrance. Instead, the literature seems focused on the narrow message that early college entrants do well, and that there are little or no emotional adjustment problems among these students.

Over the years my colleagues and I have conducted several studies of early college entrance, and contrary to the existing literature, we have found mixed results. Some of our data have yielded positive findings that early college entrants showed healthy personality characteristics and evidenced emotional growth while in their program (Cornell, Callahan, &

Loyd, 1991c). I had no difficulty publishing these findings, which were well-received by conference audiences, positively endorsed by journal reviewers, and generally accepted by others in the field. This study only included students who remained in the program long enough to complete baseline and follow-up measures over the course of a single academic year.

Some of my other findings have been much less positive. In another study of the same early entrance program we found that approximately half the accelerants we studied experienced emotional problems and depression, and that students tended to drop out of the program at a high rate (Cornell, Callahan, & Loyd, 1991a, 1991b). In a follow-up study we surveyed students after they either graduated from the program or left it for other reasons. Some of the students were pleased with their early college entrance experience, but nearly all of the respondents described it as stressful. Many students voiced strong criticisms of their experience (Cornell, 1992). Here are examples of two strikingly negative comments about the program:

> *The program is a good idea, but in practice it falls very short of its goals. The program seemed to perpetuate and even instigate serious emotional problems. I couldn't tell you why that is, but maybe you should find out in one of these surveys how many students are or were suicidal, how many are in for counseling. I still think the program is a great idea, but it wasn't implemented well.*

Another comment:

> *Would I attend the program again? No. It was too much money, too stressful, and did not achieve my expectations of it. Rather than leaving the program a self-assured, confident young woman, I left the program with little confidence, a nervous stomach, psychiatry problems, and very little knowledge about anything.*

Study results like these are not readily received in the field. There is a strong reluctance to uncovering adjustment problems among early college entrants. Ironically, I know that members of our field are capable of setting high research standards because I found such standards applied to these studies when they read them. Of course I cannot dismiss legitimate criticisms of any study and these must be addressed. These were not perfect studies. However, we must apply similar standards to all of our findings, positive or negative. The weight we give to the limitations of any study should not be influenced by the direction of its results. If we can accept case studies and qualitative data from small samples of students who

succeed in early college entrance, we must be open to similar evidence from students who had a less positive experience.

Recommended Practice 99: Especially Develop Positive Self-Concept in Gifted Underachievers

The belief that self-concept is a critical factor to achievement is widespread in general education as well as gifted education. In our review of literature (Shore et al., 1991) we found surprisingly little empirical evidence that improving a student's self-concept will reduce achievement problems. There are many case reports, books, and articles claiming effective treatment for underachieving students, but we need controlled studies to investigate whether these claims are true. Imagine if the Food and Drug Administration regulated psychological and educational interventions in the conservative way they regulate medicinal interventions. No pharmaceutical company can market a drug for children unless they have conducted extensive testing to demonstrate that it is safe and effective. How would it affect the field if no psychological or educational interventions could be marketed in the absence of controlled studies demonstrating their effectiveness?

Comprehensive educational and psychological interventions for underachievement have been described by Rimm (1986) and by Whitmore (1980). To their credit, these approaches focus on more than self-concept, although self-concept is a focus of concern. The proponents of these approaches report considerable success with many children. Nevertheless, we still need empirical research to demonstrate the effectiveness of any intervention program and to improve our understanding of underachievement.

There is such widespread belief throughout education that poor self-concept impairs academic achievement that it seems sacrilege to express any reservations. Certainly one can think of numerous examples of underachieving students who have deficiencies in their self-concept. And there is good evidence that underachievers have poorer self-concepts than other students (Shore et al., 1991). However, correlation is not causation, and one might just as well posit that academic problems damage a student's self-concept, or that both self-concept and achievement are adversely affected by some other favor, such as a learning disability or family conflict.

There is still a great deal of basic research to be done on the relation between children's self-perceptions and their achievement. One of my students completed analyses for a doctoral dissertation examining the relations among intrinsic motivation, self-concept, and academic achievement (Goldberg, 1993). He did not study underachievement, but he did address the more general issue of the causal relations between

self-concept and academic achievement. Using structural equation modeling, he examined how intrinsic motivation, self-concept, and academic achievement interacted over time.

The sample consisted of over 600 high ability students in the 2nd or 3rd grade. Academic achievement was assessed by three subtests of the Iowa Test of Basic Skills. Self-concept was measured by academic and social subscales of the Self-Perception Profile for Children (Harter, 1985), and intrinsic motivation was measured by the two components of the Intrinsic versus Extrinsic Orientation in the Classroom scale (Harter, 1981), autonomous judgement and intrinsic mastery motivation. (Autonomous judgement refers to a child's tendency to evaluate his or her work based on internal standards rather than perceived teacher standards. Intrinsic mastery motivation refers to the child's tendency to initiate activities out of personal curiosity and preference for challenge rather than because of extrinsic reward). Students were assessed on two occasions approximately seven months apart during a single school year. He tested a cross-lag panel model using structural equation modeling techniques. He examined both concurrent relations among the constructs when measured at approximately the same time, and predictive relations when they were measured at two points in time. Concurrently, there were positive correlations among all three constructs. Self-concept was positively correlated with both achievement and intrinsic motivation, and intrinsic motivation was positively correlated with achievement. However the path between self-concept and achievement was relatively low in magnitude, .15, and accounted for less than three percent of the variance in achievement test scores.

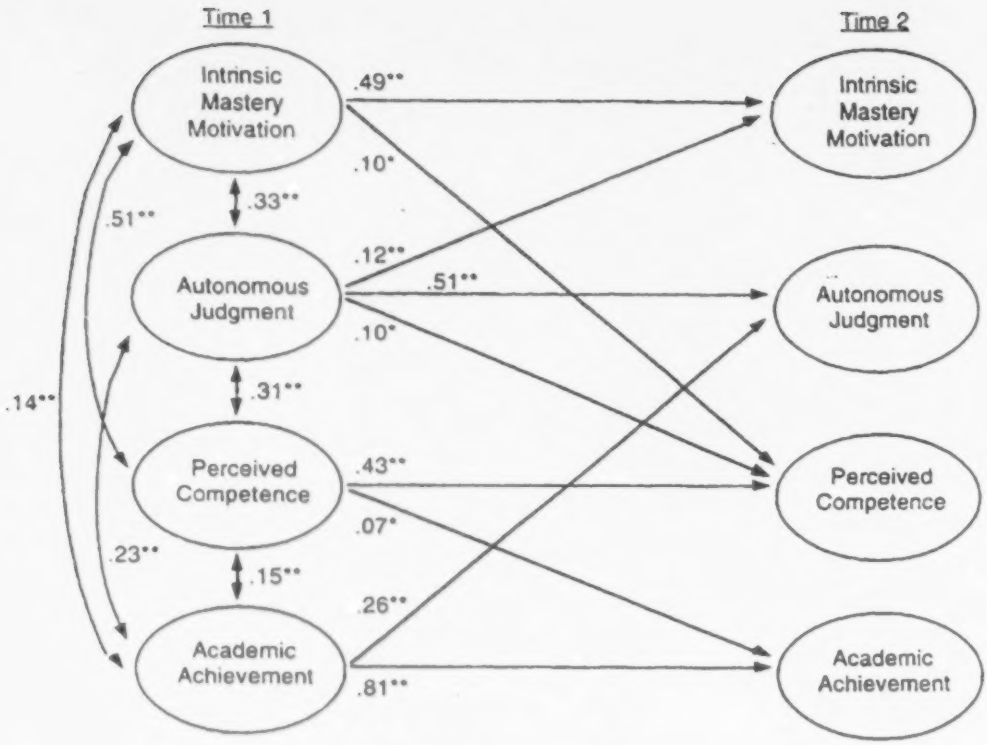

Figure 1. Exploratory Causal Model

The predictive analyses examined the influence of intrinsic motivation and self-concept on subsequent achievement, taking into account the effect of prior achievement. As might be expected, achievement at Time one had a large effect on subsequent achievement at Time two. With this effect controlled, intrinsic motivation at Time one had no predictive effect on achievement at Time two. Self-concept at Time one had only a small effect on achievement at Time two, .07, accounting for less than one percent of the variance.

These findings raise questions about the presumed impact of self-concept on academic achievement among high ability students in early elementary grades. Children's conceptions of their abilities do not appear to be as closely tied to their achievement as we commonly believe. These findings are by no means conclusive, and there are a series of research questions and methodological issues to be addressed in further study. For example, performance on standardized achievement tests is not equivalent to classroom learning, and self-concept is a multi-faceted construct which can be dissected into increasingly specific and discrete academic and non-academic components.

My speculation about the course of this research is that increasingly we will focus on the factors that shape self-concept rather than selfconcept in itself. These factors include the child's emotional adjustment, social learning experiences in school, parent expectations, and other factors. We will come to regard self-concept as a convenient, but somewhat artificial, intermediate concept falling between those factors which shape what we term self-concept and the outcome variables of interest, such as school achievement and career choice. There are interesting research questions to ask about the factors which shape a child's self-concept of his or her academic ability; this brings me to the next recommended practice I want to discuss.

Recommended Practice 101: Secondary Mathematics and Advanced Science Should Be Part of the Curriculum for Gifted Girls

It is one thing to recommend that bright girls study mathematics and science, it is quite another to get them to take the courses. One reason girls often do not pursue secondary school coursework in mathematics and science is that they lack confidence in their abilities (Eccles, 1985). Many high achieving girls suffer from what Phillips (1984) termed an "illusion of incompetence" (p. 2000). Why do otherwise capable girls tend to believe they are not capable in mathematics and science? Several studies have found that when it comes to the subject of mathematics, parent expectations for daughters are lower than for sons (Parsons, Adler, & Kaczala, 1982; Phillips, 1987). Phillips found that children's beliefs about their own abilities were more strongly influenced by their parents' views than by their own past academic performance.

How do parent expectations affect daughters who have high abilities? Another of my graduate students, Margie Dickens, conducted an investigation of parent influences on the mathematics self-concept of high ability adolescent girls. I will summarize briefly just one aspect of her dissertation. Dickens (1990) was interested in the relationship among three constructs: daughters' mathematics self-concept—that is, how capable the daughters perceived themselves to be in mathematics; parents' mathematics self-concept—how capable the parents perceived themselves to be in mathematics; and parental expectations for their daughters in mathematics. She questioned whether parents' own mathematics self-concepts affected their expectations for their daughters, and how those expectations affected their daughters' self-perceptions.

The sample consisted of 165 girls ages 11 to 16 who attended the University of Virginia Summer Enrichment Program. On average, these girls scored at the 95th national percentile in mathematics achievement using

the Science Research Associates standardized test. No student scored below the 65th percentile; 84 percent scored at or above the 90th percentile; and 36 percent scored at or above the 99th percentile—so these were girls who were clearly capable in mathematics. These girls and their parents took a series of scales developed by Eccles (1980) to assess mathematics self-concept and parent expectations for their daughters in mathematics.

Using the technique of path analysis, Dickens (1990) examined the effect of parent mathematics self-concept and parent expectations on the daughter's mathematics selfconcept. She found that the parent's mathematics self-concept had no direct effect on the daughter's mathematics self-concept, but that the parent's mathematic self-concept did seem to influence the parent's expectations for the daughter. In turn, parent expectations were strongly associated with daughter mathematics self-concept. The results were unchanged after controlling for mathematics achievement scores. The path analyses were strikingly similar for mothers and fathers.

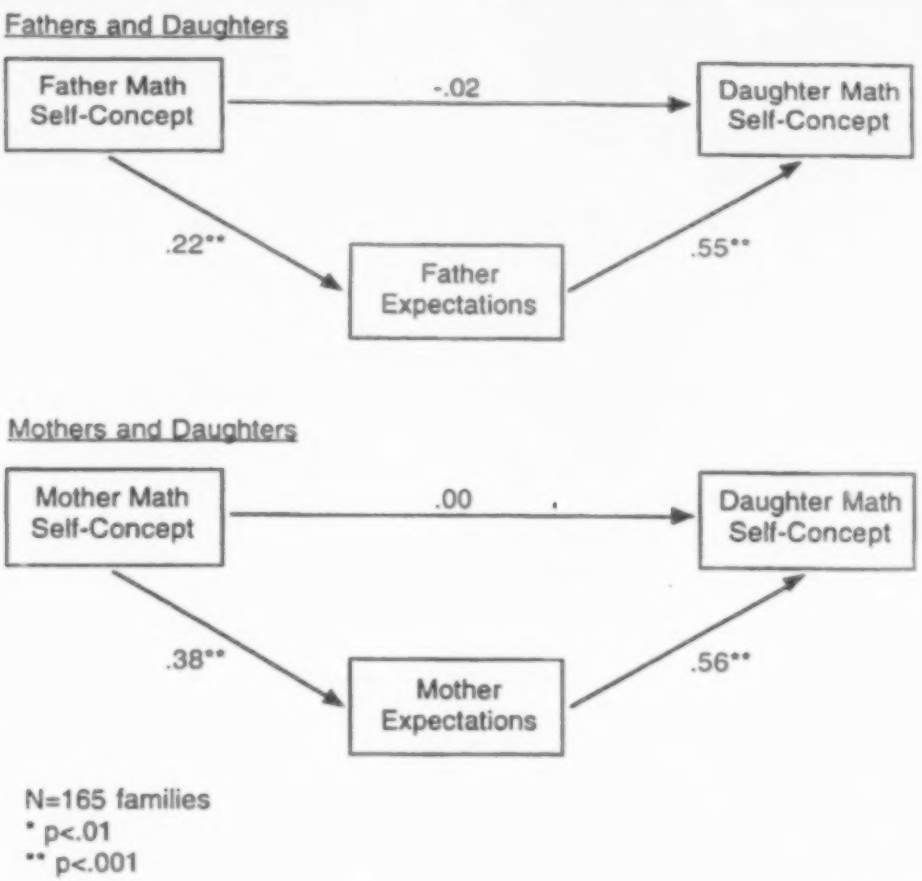

Figure 2. Parent influences on the mathematics self-concept of high ability adolescent daughters

The results of Dickens' (1990) study do not prove a causal relation, but they support the view that parent expectations have a strong effect on their daughters, even when their daughters have high abilities in mathematics. With continued findings such as these, we can identify ways to put this recommended practice into action. For example, it may be important to counsel parents about the influence of their expectations on their daughters, and to help parents to clarify the basis of their expectations. Parents may place too much weight on their own experiences in mathematics, rather than fully recognizing and appreciating their daughter's ability and encouraging her to excel.

Barriers Between Research and Theory

Although the recommended practices project focused on the gap between research and practice, there was an equally apparent gap between research and theory. Most studies were conducted in theoretical isolation, only loosely related to the existing body of knowledge. We observed that new studies frequently were poorly integrated with previous research. Ideally, studies are linked by shared theoretical concepts and hypotheses which can be examined and refined across projects. Theories provide the roadways that link studies together and allow us to move forward toward clear destinations. The results of each new study should help to confirm or extend knowledge gained from previous studies, but we had difficulty synthesizing the results of various studies into general statements of knowledge.

The literature in gifted education has a surplus of one-shot, one-of-a-kind, exploratory investigations that are never followed-up, replicated or extended. The concluding comments in these studies are strikingly similar. Such studies always raise questions but never help to answer questions. They suggest need for further study but such studies rarely ensue. Everyone wants to break new ground, but no one wants to dig the foundation and erect the building. As a result, our non-cumulative knowledge base has feeble influence on either theory or practice.

Of course, the gap between theory and research is not unique to gifted education. This problem has been raised in other fields. Most notably, Paul Meehl published in 1978 a classic article on the limitations of research in psychology. The article was entitled "Theoretical risks and tabular asterisks: Sir Karl, Sir Ronald, and the slow progress of soft psychology." In this article he addresses the problem of non-cumulative knowledge in psychology. Studies do not seem to contribute to a specific knowledge base that grows over time. Instead, studies direct our attention first toward one hot topic and then another, and theories wax and wane without ultimately answering our fundamental questions. As Meehl contended, old theories never die, they just fade away. Read articles written 30, 40, or 50 years ago in gifted

education and ask yourself whether we have answered the questions they raise. Have we answered yet the basic questions investigated by Terman?

Meehl argues that one of the problems in psychological research—and I think his observations apply equally to research in gifted education—is that our theories are so general and ambiguous that it is difficult to disprove them. They often do not lead to specific testable hypotheses. Meehl gives the wonderful example of a theory which leads to the prediction that it will rain more in April than in May. This is a relatively weak and non-specific prediction; there are many theories one could imagine which might predict the same outcome of more rain in April than in May, so that even a positive finding does not give much evidence in support of one particular theory. A more rigorous theory might predict how much more it would rain in April than in May. A theory able to generate this more specific prediction would be strongly supported by a positive research finding. And finally, an even more rigorous theory would predict which days in April would receive rain and how much rain would fall. This would be an exciting theory! Unfortunately, our theories in gifted education all seem to fall into the category of predicting more rain in April than in May.

Our weak theories are compounded by equally weak methodological standards, particularly our reliance on the statistical significance of group differences. In the title of Meehl's article, the term "tabular asterisks" refers to our obsession with obtaining statistically significant results that allow us to place asterisks on our manuscript tables. I have often thought those little asterisks were sublimatory substitutes for those precious gold stars elementary school teachers used to put on our homework assignments.

Meehl criticized our reliance on statistical significance testing and the associated emphasis on rejecting the null hypothesis, sacred tenets which Meehl attributed to the work of Ronald Fisher and Karl Popper, respectively (the individuals named in Meehl's subtitle). As Meehl (1978, p. 817) stated so forcefully:

> *I suggest to you that Sir Ronald has befuddled us, mesmerized us, and led us down the primrose path. I believe that the almost universal reliance on merely refuting the null hypothesis as the standard method for corroborating substantive theories in the soft areas [of psychology] is a terrible mistake, is basically unsound, poor scientific strategy, and one of the worst things that ever happened in the history of psychology.*

Meehl reminded us that any theory with a grain of truth can find some modicum of empirical support through statistical significance testing. Even the smallest group difference can be statistically significant in a sufficiently large sample. As Meehl stated, "Putting it crudely, if you have enough cases

and your measures are not totally unreliable, the null hypothesis will always be falsified, *regardless of the truth of the substantive theory*" (Meehl, 1978, p. 822).

Because significance testing is such a weak means of testing our theories, we should move beyond reliance on probability levels and pay more attention to effect sizes. As Jacob Cohen (1988) has been pointing out repeatedly for over 40 years, group differences or correlations may be statistically significant, but trivial in magnitude. Our standard should not be just that a group difference is large enough that it is probably greater than zero, but that it is large enough to be meaningful in some real world application. Conversely, Cohen has demonstrated that researchers often undertake studies with such small samples that even if their underlying theory is correct, they would be highly unlikely to obtain significant results. Recently Cohen (1992) observed that researchers still ignore the importance of power analyses and effect sizes. The value of effect sizes is perhaps best indicated by their critical role in the technique of meta-analysis. Meta-analysis is a statistical technique which has revolutionized literature reviews because it permits a direct quantitative comparison and integration of findings among different studies. However, it is almost always the case that authors of meta-analyses must calculate the effect sizes themselves because they are not reported in the journals. Journals in gifted education have an opportunity to lead the way in education by requiring that authors report the effect sizes for their findings Although researchers may be reluctant to report effect sizes because they fear they will be so small as to undercut the importance of their findings, Rosenthal (1990) has pointed out that our expectations for effect sizes may be too high, and that in fact seemingly small effect sizes can produce powerful effects in real world applications.

Strategies for Change

In summary, the skeptics are correct that there is a substantial gap between practice and research, as well as between theory and research. Most of the practices in the field, including many of the influential and pervasive practices, are not based on research evidence of their validity or effectiveness. No matter how compelling their proponents, practices should not be based on untested theories and unexamined advice. Practices should not be implemented because they are politically appealing or popular, or merely convenient to implement. Proponents of various educational practices may invoke fascinating theories illustrated by three dimensional models, compelling metaphors or intellectually pleasing terminology, but in the final analysis all practices must stand or fall on the basis of their practical effectiveness in our schools. To determine their effectiveness one must rely on some form of data-based research. Here are some strategies for improving research in gifted education:

1. Institute Voluntary Certification of Gifted Programs

The usual argument for voluntary certification of any program is that it will improve the quality of services. I agree. However, I make this recommendation for the more unusual additional reason that it will improve the quality of our research.

The quality of gifted programs varies drastically from one school system to another, with some programs providing a minimum of differentiated educational services. Certainly there is no need for absolute uniformity of programs, particularly since there are several viable models of gifted programs and different programs may have different educational goals, but the lack of even minimum standards weakens the credibility of gifted education as a whole. Certification could build upon the *Standards for programs involving the gifted and talented* developed by The Association for the Gifted (TAG) of the Council for Exceptional Children (TAG, 1989). As a starting point, the minimum standards might include:

1) Use of reliable and valid identification methods;
2) Teachers with some specialized training in gifted education;
3) A minimum number of hours of differentiated instruction;
4) Explicit educational goals which can be operationally defined and measured;
5) A commitment to assess student learning outcomes relevant to the program's educational goals.

How would certification improve research? Standards like these would encourage a much closer relationship between research and practice. This relationship would be reciprocal and mutually beneficial. Researchers would serve a valuable practical function in selecting identification methods and assessing student learning outcomes. In addition certified programs would be attractive to researchers as a much more credible site for study or source of subjects.

These kinds of standards, particularly standards for identification and for assessing student learning outcomes, would make research clearly relevant and indeed necessary to maintaining certification. Research could become a practical component of the educational process.

2. Establish a National Research Agenda

The field should undertake a major effort to articulate explicit research questions for each major subfield or practice area in gifted education. This agenda might begin with recommended practices in the field. Aspiring

researchers, graduate students, and educators planning research projects could benefit from an established research framework in which to plan and conceptualize their studies. One major goal of the recommended practices project (Shore et al., 1991) was to assist researchers in identifying practical research needs, and a national research agenda would be a next logical step in furthering this goal.

It is not necessary to tie every research project to a specfic recommended practice. It may be possible to identify research needs around central topics that cut across two or more practices. For example, this year Colangelo and Assouline (1993) articulated a research agenda for research on families of gifted children. They observed that although "research and writing on families of gifted students have increased in the last two decades...the clarity and cohesiveness of the findings have not because the questions have covered a broad array of issues, i.e., the effect of the gifted label, parent-school interactions, parental involvement in their gifted child's education, etc." (p. 1).

Reviewers for journals and conferences in gifted education could motivate use of these research agendas by requesting that authors attend to this issue in their manuscripts and presentation proposals. What would be the impact if every journal or conference review form had a line for rating the study's link to the specific research agenda for that area?

3. Improve Research Standards

Journals in gifted education have improved dramatically in the past ten years. Especially outgoing editors John Feldhusen of *Gifted Child Quarterly* and James Gallagher of *Journal for the Education of the Gifted* have done the field a tremendous service and more than anyone else have helped to place gifted education on a footing with other fields of education.

Our journals should not only set high standards for published research, they should use their pages to advance and encourage even higher standards. Increased standards should be accompanied by a concerted effort to teach and assist first-time researchers, teachers, administrators, and anyone else who wants to conduct research in gifted education. Too many individuals in the schools undertake projects with inadequate measures or flawed designs. Journal reviewers only learn about these projects when it is too late. This is a tremendous waste of time and energy which could be prevented.

Here are several ways to assist novice researchers:

1) Our national organizations could provide limited research consultation to aspiring researchers during national conventions. For example, the Research and Evaluation seaion of NAGC could hold workshops and consultation sessions with teachers and

administrators who are planning to conduct research projects. A panel of volunteers could provide brief consultation to individual researchers who do not have access to experienced researchers.

During the year a panel of experienced researchers might agree to provide additional consultation by reviewing research proposals by mail. The time required of the proposal reviewers need not exceed what they ordinarily devote to reviewing journal submissions. I am sure many reviewers have had the experience of wishing they could have pointed out the fatal flaw in a study before the data were collected rather than after the manuscript has been submitted for publication.

2) Our journals could publish a general set of standards for all research manuscripts. For example, these standards could include guidelines for describing the demographic and aptitude characteristics of subjects, and for identifying the reliability and validity of study measures. Although these standards might be superfluous for most researchers, for others they would be helpful. Tuckman (1990) expressed similar concerns about the quality of educational research in general, and proposed a series of criteria for journal reviewers to use in evaluating manuscripts. These criteria could help form the basis for standards in gifted education.

3) In addition, the journals might consider a regular column or article series on research methods and multivariate statistics relevant to common research projects in gifted education. Other journals such as *Journal of Counseling Psychology* and *School Psychology Review* have published series of articles explaining various multivariate approaches as they apply to their fields. These are very useful articles which I often give to my graduate students. For example, my former student Dickens made good use of an article about path analysis by Keith (1988).

4) Journals could welcome and promote use of more sophisticated statistical techniques. Journals in gifted education could take a leadership role in education by requiring that authors report effect sizes whenever appropriate. Journals should encourage greater use of multivariate statistics, whenever such statistical procedures would be appropriate and informative. This is not to reject the use of qualitative research, or to advise against univariate statistics when a simpler approach will do the job. However, researchers should not receive reviewer comments that caution against use of data analytic procedures that are

"too complex" or "too statistical" for the journal readership. As proponents of gifted education, we should not be in the position of "talking down" to our readership. Our expectations and our standards should be high, not low.

Conclusion

Barriers to research in gifted education can be found in many different places. It is not simply a matter of asking educators to be more cooperative with our efforts, it is also a matter of improving our methods and refining our theories, and demonstrating that we have something useful and valuable to offer.

While working on this presentation one Saturday afternoon, there was some sort of conference in the School of Education building where I work. My door was open and I overheard in the hallway one man say to another, "The thing I like about education is that if anybody questions what you're doing, you can always just give them a line and they think you know where you're going." I thought to myself, this is the main thing we should dislike about education and what we should work to change.

Textbooks in gifted education describe typical features of the children we label gifted. Among those characteristics which we value and attempt to nurture are the child's willingness to challenge conventions and to look at things from a new perspective, rather than accepting the status quo. We hold in high esteem the child's idealism and high standards. We regard as essential to giftedness the child's willingness to tackle difficult problems, and to work toward them with a high level of task commitment. I suggest we should value the same qualities and strive for the same high standards in our research.

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